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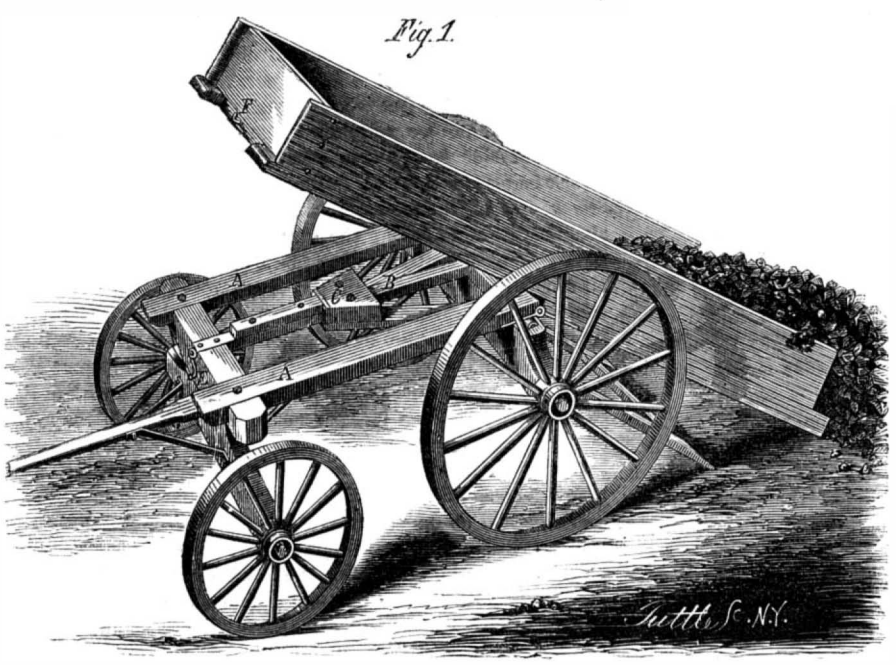
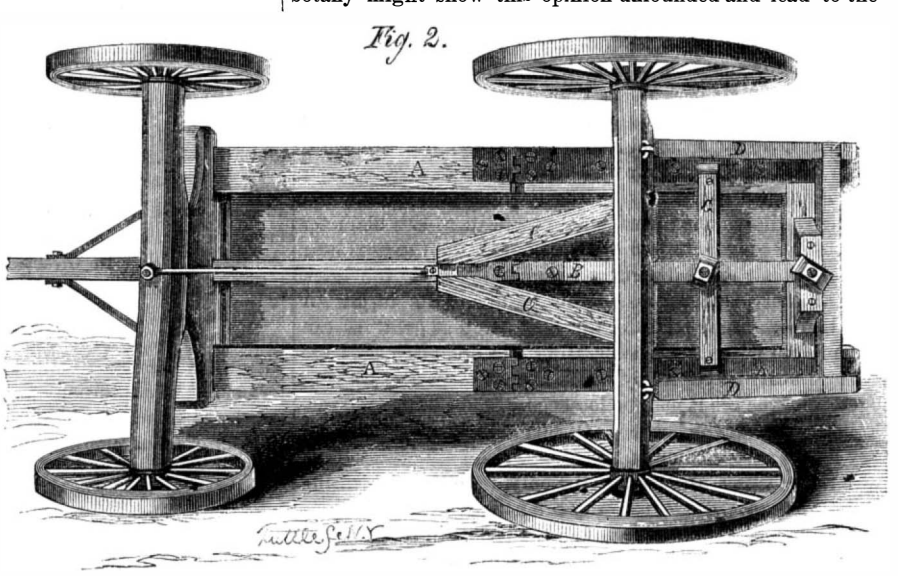
Improved Dumping Wagon.

Loads of coal, stone, gravel, etc, carried in a box wagon or a four wheeled vehicle, must be removed by the shovel or hand, a slow and laborious process. Two wheeled carts only, can be tipped to discharge the load in one heap, but carts are hard upon the horse and do not have the capacity of wagons.





MUNGER'S IMPROVEMENT IN WAGONS

To remedy these defects the wagon seen in the accompanying engravings has been contrived, and its operation is all that could be desired.

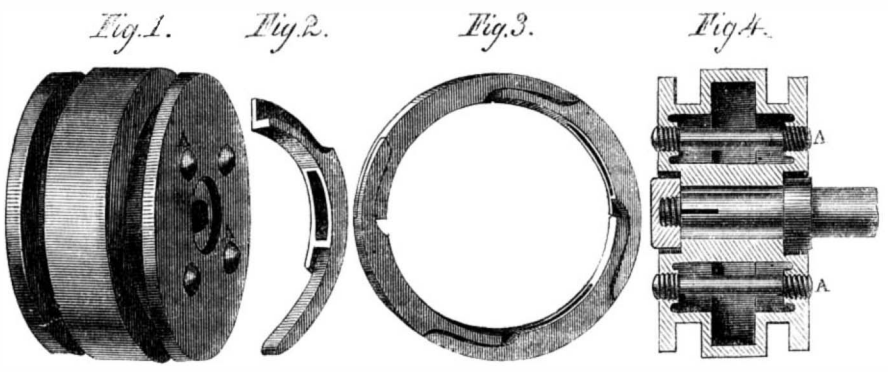
Fig. 1 shows the wagon in the position of dumping a load, and Fig. 2 is a view of the under side showing its peculiar construction. The hind axle, instead of being rigidly secured to the body, is made to slide on the frame. The side bars, A, of the frame are hinged at a point near the center, the back part forming a portion of the wagon body. On the side bars of this portion the straps of the hinges extend to the back end. On these iron straps the rear axle slides, its movement being facilitated by rollers set in the bolster or upper portion of the axletree. A central longitudinal bar, B, also hinged in line with the side bars, serves partially as a guide to the axle from which two diagonal braces, C, extend to the central bar. A brace also passes from this bar to the king bolt on the forward axle. The braces where they converge, embrace the central bar as seen at C, Fig. 2. A frame, D, same figure, is hinged to the back of the rear axle, and when this axle is in place is held to the body by a button, which thus thus keeps the axle in place and holds the body and frame snugly together by the aid of a hook, E, on the forward bolster which catches into a staple on body front at the F, Fig. 1. The wagon is now in posi tion for drawing a load.

When the load is to be dumped the frame, D, at the rear of the axle is unfastened and allowed to fall with its end resting on the ground as a brace, seen in Fig. 1, the front hook is unfastened, and the horses backed, which runs the body back on the rear axle until it has passed the central hinges when a very slight effort will tip the body and deliver the load. To return the rear wheels to their former position, block them in front and start the team. In Fig. 2 is seen a cross bar, G, with a button by which the rear wheels may be held in the position shown in Fig. 1, if it is desired to draw a light load and discharge it without sliding the rear axle. A patent was granted for this combination Feb. 12, 1867, to George N. Munger, of New Haven, Conn. For further information address all communications relative thereto, to A. D. Platt 158 Broadway, New York.

Improved Engine Piston.

The use of the steam itself as a spring to keep the packing rings of a cylinder piston out to their work, is gradually superseding the employment of setting-out springs, and when the steam can be made to act with the pressure, is certainly an improvement. The engravings are views of such a piston which, if extended trials and the opinions of practical men are of any value, is a vast improvement on the piston and rings ordinarily used. The inventor claims that the rings adapt themselves better to any irregularities in the bore of the cylinder than other rings, and also when, as in those of steam hammers, one end is worn larger than the other; that it is always steam tight in cylinders of regular form, making a saving in fuel, as no steam can escape before having done its work; that there is less friction than with the common piston, as it is always in proportion to the pressure of steam.

Fig. 1 is a perspective of the piston with the segments of the ring removed. Fig. 2 is one of the segments, Fig. 3 the segments placed in position, and Fig. 4 a section through the piston. The piston is a single casting, cored, and having no follower to be bolted on. The coring between the hub and the periphery renders it light, while the screw bolts, A, which pass through it and are riveted on the outside, strengthen it and close up the holes left for the support of the cores, steam tight. The piston rod has a collar on it, seen at B, Fig. 4, which may be either recessed into the piston as in the engraving, or may come square against the outside or head. The rod for the piston of a horizontal cylinder, passes through a hole oval in form—seen in Fig. 1—by which the piston can be shifted up or down to keep the rod always in the center of the cylinder. When an engine has been run a long time and it becomes necessary to remove the piston from the rod, the nut which secures it, is sometimes corroded on the thread so that it is difficult to start it. To remedy this difficulty the inventor of this piston cuts a slot



WHEELOCK'S PISTON AND PACKING RING.

in the end of the piston rod, as in Fig. 4, which allows the thread to "give" or spring in the act of unscrewing the nut. If salt or brackish water is used, this slot might become closed, and to prevent this a cap nut is used.

The form of the segment rings is seen in Figs. 2 and 3, and their peculiar joints are represented where joined in Fig. 3. This form allows free action, as on hinges, between the sections, so that they can adapt themselves to the irregularities of the internal surface of the cylinder. They are of cast iron, the joints being milled and the face and edges turned. By reference to the engraving it will be seen that where the joints approach, a slight bevel is cut which allows the steam to pass behind and under the segments forcing them outward and also holding them firmly against the inner face of the annular groove. For this purpose the bosses of the heads are turned somewhat smaller than the center boss which fits the cylinder. As these beveled channels are toward the outside of the piston it will be seen that in moving in one direction one set of rings are packed, and in the other direction the other set engage with the cylinder surface.

Patents were granted for this device April 5, 1864, Nov. 28, 1865 and April 23, 1867, to Jerome Wheelock. For further particulars address the patentees and manutacturers, Wheelock & Wheeler, Worcester, Mass.

Science Familiarly Illustrated.

The Province of Plants.

Disease and even death have been said to be caused by sleeping in rooms with growing plants. A knowledge of botany might show this opinion unfounded and lead to the invention of a more plausible reason. A familiar discourse on the office of plant life in the economy of nature may not be uninteresting to our young readers.

Among the constituents of the air is carbonic acid. This gas is unceasingly generated in those regions of the earth where volcanoes are now, or were in a former age active; in all ordinary combustion; in the decay and putrefaction of animal and vegetable substances; and in the respiration of men and animals, for in breathing, the oxygen inhaled combines in the body with carbon, thus constantly deteriorating the air by removing the free oxygen or vital air, and creating an excess of carbonic acid. If all the gas thus formed should accumulate, it would speedily destroy animal life, as witness the fatal results when it is collected in deep wells or, under the name of choke damp, in coal mines.

To maintain the proper equilibrium in the atmosphere is the province of the plant kingdom the principal means for whose support being the carbonic acid exhaled by men and animals as useless, but which is absorbed by them and in its place an equal bulk of life-supporting oxygen is given out. Every wind carries the poisonous carbonic acid to the plants, it is taken in through their thousand stomates or breathing pores, it combines with the elements of water and is elaborated into organic matter, thus furnishing food first for the herbivores, then for the carnivorous animals that feed upon the herbivores. So then all our food is either directly or indirectly derived from the plants. The round is completed after the food is digested, has entered into the blood and becomes finally decomposed into carbonic acid and water, and exhaled from the lungs, to be again taken up by vegetation.

Plants also draw nourishment from the earth, and as we have already seen that flesh is formed from the vegetable world, so now we may affirm that the earthy matters of the bones, the iron and other mineral matters in the blood are derived from the same source, so that animals depend absolutely upon plants for their very existence and the great object for which the vegetable world was created seems to have been to stand between the animal and mineral worlds and organize portions of the former for the sustenance of the latter.

BESSEMER STEEL WARE.—It has lately become a familiar test of a certain quality of Bessemer steel, to press a cold plate of it through a tubular die, producing a smooth and flawless cup or pail. This experiment suggests a valuable manufacture for domestic purposes. All kinds of hollow ware made of such metal, being without seam, and much less affected by oxidation, acids, heat etc., than common iron, would be more economical at a higher price. At the same time, the higher value of the steel per pound might be nearly or quite balanced by reduction in the cost of manufacture and the weight of metal. Russ of Gratz, it seems, has commenced this manufacture, though to what extent we are not informed.

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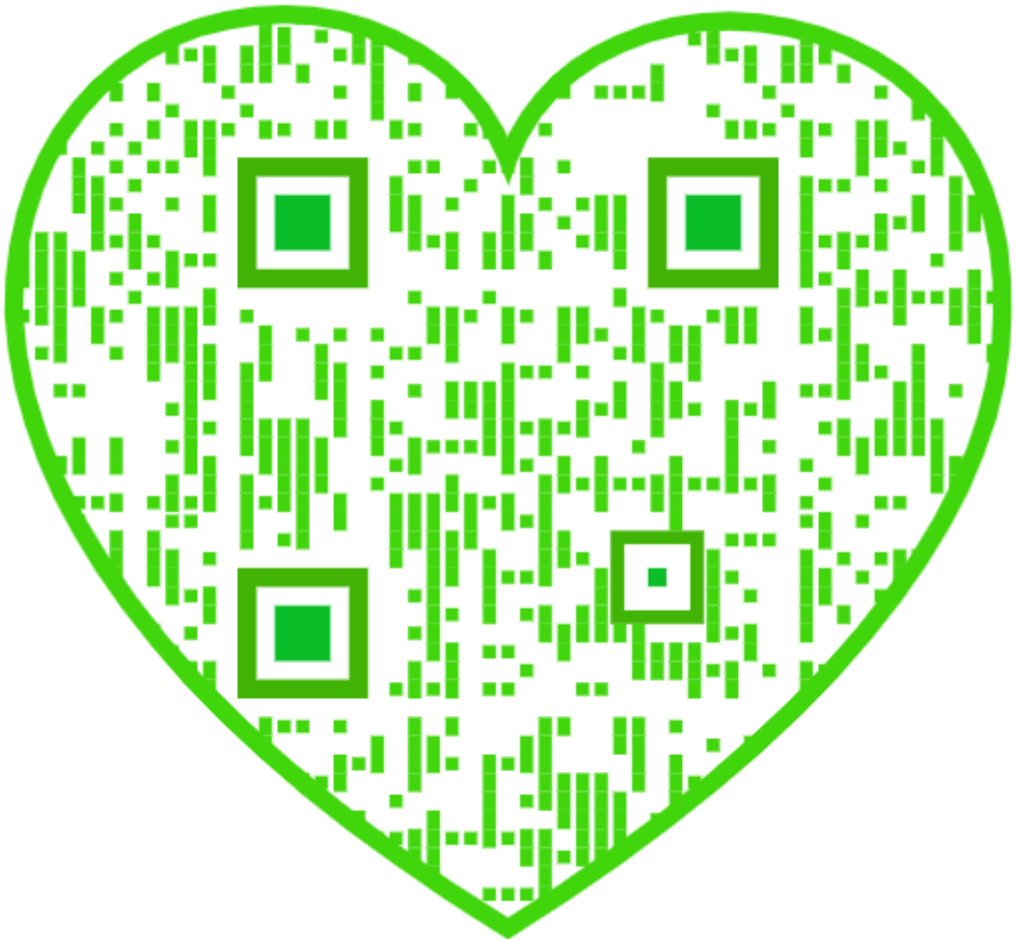

Special correspondence of the Scientific American.

THE EXHIBITION OF IRON AND STEEL.

PARIS, May 7, 1867.

THE BESSEMER PRODUCTS—SUCCESS OF THE SWEDES.

Those interested in the iron manufacture and in the progress of the Bessemer process, will find much in the Exhibition to interest them. The circle next inside of that devoted to machinery is in most cases chiefly devoted to metallurgical exhibitions. Many of specimens present little that is of interest, but there are some that are deserving of attention. In the Swedish department there is one of the most instructive collections of specimens of Bessemer steel containing different per centages of carbon. They are in the form of round bars which have been torn asunder by Mr. Kirkaldy's testing machine in London, to ascertain their relative tensile strength as well as their ductility. The number of bars is quite large and the experiments appear to show that nine tenths of one per cent of carbon gives the greatest tensile strength. Above that proportion the steel loses tenacity, as it approaches the condition of cast iron. A number of small bars are broken across to show the difference of fracture caused by repeated meltings, up to fifty times. The change due to this cause appears to be very slight, while that consequent on the varied proportions of carbon is of course very great. The Swedes have succeeded in accomplishing what many makers have been unable to do, viz., to draw fine wire from the Bessemer metal. A large coil of No. 47 is shown, and it is said that they draw even finer numbers than that. Specimens of cutlery are also exhibited, and warranted by the makers to be of excellent quality. A model is shown of a calcining kiln much in use in Sweden, and with which any percentage of sulphur less than four per cent may be wholly expelled from the ores. It is much higher than usual and tapers to a less diameter towards the top. It is fed with gas from the furnaces near the bottom, air being drawn in through holes in the brick work at intervals for a considerable portion of its hight. A high temperature is attained, the heat being as great as can be employed without agglomerating the ore, and doors are provided near the tweers by which in case of partial sticking together of the ore it may be loosened. The charge is drawn through doors at the bottom. Of course the display of ores is very fine from this country.

In the Russian department the only objects for which the exhibitors can claim superiority are horseshoe nails of their usual excellent quality of iron, and the beautiful Russia sheet iron with its non-oxydizing skin, with which we are so familiar in America, but which is so little used elsewhere.

THE FRENCH METALLURGICAL DEPARTMENT.

The most remarkable exhibitions by French makers are contained in special buildings in the grounds. In one of these Messrs. Petin, Gaudet & Co. exhibit two halves of a large steel ingot weighing 25 tuns, which has been broken across to show the fracture. It appears remarkably free from the porosity generally existing in these ingots before hammering. A steel crank-shaft weighing 7½ tuns and about 18 inches in diameter is also exhibited, and a steel gun of 9½ inches bore and 16 tuns weight, besides a number of other articles of steel, as shot, rails, tires, etc., representing the usual branches of this manufacture. The display of iron is equally interesting. There are a number of rolled girders of varying hights, from 3 feet 3⅜ inches downward, and of lengths increasing as the hights diminish, the weight of each specimen being not far from 2½ tuns. A rolled engine-beam 36 feet long, 5 feet 11 inches wide in the center, and 2½ inches thick, is also shown. This firm, who have been able to compete very successfully with the large Sheffield makers of armor plate, exhibit a plate weighing nearly ten tuns and approaching very nearly in thickness to the crop end sent by Messrs. John Brown & Co., being 11⅞ inches thick. The quality of iron produced at these works is very good. The ore is largely brought from Sardinia, and some fine specimens of this are exhibited.

On the opposite side of the main entrance to the grounds from this building is another, containing the collection of objects sent by the Compagnie Anonyme des Forges de Chatillon Commentry. The works of this company are among the most extensive in France, and the amount of iron produced, I am informed, is about one twelfth of the total production in the whole country. The most remarkable object in the collection is a rolled girder, of which a number were made for some docks at Bordeaux, of the extraordinary hight of 3 feet 7½ inches, the width of the top and bottom flanges being very nearly 12 inches. Another piece, of the same section has been curved in a vertical direction. These girders are not welded, as some might be inclined to imagine, but have been regularly rolled from piles formed of suitable slabs. The same company also send specimens of armor plate, but though of what would but a short time ago have been considered remarkable thickness, they do not approach those exhibited by the last mentioned firm or the English makers. Whether their rolls are heavy enough for such sizes or not I do not know.

At a little distance from these is another building devoted exclusively to the products of the works of Mr. Schneider, at Creusot. In addition to two large machine engines, and a fine winding engine for a mine, which I shall have occasion to mention in a future letter, there are some very interesting specimens of iron and steel. The exhibitor has shown great judgment in the arrangement of the pieces. They are divided into classes according to the percentage of carbon contained, or the process by which the manufacture has been carried on, whether it be by puddling or the Bessemer process, by squeezing or by hammering in the subsequent treatment, or finally whether the hammer or the rolls have been employed to produce the finished article. In each class he gives first a specimen of the primitive bloom and then successive samples showing the condition of the material in each stage of its working. A number of iron rails are exhibited, broken so as to show the fracture, but though there are some that look very well, the majority appear too soft for proper durability. Accompanying his exhibition of products are very interesting models showing the entire arrangement of the various buildings composing the works, with the facilities for the shipment of goods by railway. The walls are also hung with diagrams and tables illustrating the system of education for the children of the operatives in schools connected with the establishment, and also other matters of interest, such as the average prices of labor of all kinds, separately and collectively, for each year since the works have been in operation. This is very simply and clearly represented by diagrams, and the gradual and almost uniform increase that has taken place is very noticeable.

THE BRITISH IN DEFAULT.

In the British department it seems as if the objects exhibited hardly represent fairly the state of the iron and steel manufacture in that country. There is nowhere any imposing display, and with a few exceptions nothing that is not equaled by articles sent from other countries. Many of the most prominent makers have sent little or nothing, relying on their already world-wide reputation to sustain their claims to notice. Thus, I find nothing from Messrs. Cammel & Co., of Sheffield, while the Bolton Iron and Steel Company content themselves with sending a plain locomotive crank shaft, remarkable for nothing as far as the eye can judge. The Low Moor and Bowling companies, which, before the days of steel, stood so high in the manufacture of locomotive tires, and still have the credit of producing the best qualities of boiler plate and other kinds of soft iron, send specimens of their products, some of which have been subjected to severe tests of flanging. In one we have a plate pressed into the shape of a high crowned hat, in another a thin sheet has been folded over a number of times in directions at right angles to each other without cracking at the corners, and other similar tests designed to exhibit the thorough tenacity of the iron. In addition to their iron they also show specimens of their beautiful coal, which has so much to do with the excellence of the former. The exhibition of the Earl of Dudley's works is also worthy of notice for the good quality of the iron and the variety in its characteristics, from very soft to crystalline or steely.

AMERICAN MINERALS.

In the American department little or nothing is shown in the way of finished products, but there is a fine and well arranged collection of specimens of ores and coals which give some idea of the natural capabilities of our country for this most important branch of industry. SLADE.

The American Lattice Bridge.

It may be considered as a generally received opinion among engineers of the present day—since it is even tacitly conceded by its once strenuous opponents—that the open web girder offers superior advantages, upon the whole, to the older and more solid sided form. Were any proof required of the general favor with which they are now regarded by the profession, two out of three large bridges erected would bear witness to the fact. When, twenty years ago, a commission was appointed to inquire into the application of iron to railway structures, its verdict respecting the open web form was that "lattice girders appear of doubtful merit," and Mr. Fairbairn in one of his works expresses a nearly similar opinion. In spite, however, of all the cold water thrown upon the new claimant for engineering consideration, it has continued steadily to make way; and it is interesting, and not a little amusing besides, to contrast its present position with that which was virtually predicted for it. The disparaging statements and condemnatory arguments urged against all girders of the open-sided form on their introduction, serve to forcibly point out that men of scientific attainments are not exempt from those foibles and prejudices which some people fondly imagine are confined to the less educated and instructed world at large. The commission was evidently wedded to the old system and could not perceive that their favorite example embodied all the particular attributes and features of the ancient methods of construction. Any one who glances at the wo different forms, beholds in the cumbersome, shapeless proportions of the solid-sided girder, the presence of that solidity and massiveness which formed a distinguishing characteristic of the days when science was unknown, or at any rate unpracticed, and when brute force was the sole power employed to counteract and resist the action of external agents. In the open web beam we recognize a worthy offspring of scientific construction. It resists the action of the strains brought upon it, not *en masse*, as in the case of its older rival, but by that due proportioning and accurate adjustment of all its various parts which can alone impart to a structure the appearance of lightness and elegance; while at the same time it bestows upon it all that strength and rigidity inseparable from the duties it has to perform. The open-web girder, which, in its widest signification, includes all those classed under the various denominations of triangular, trellice, lattice, and truss, was borrowed by us from our ingenious transatlantic brethren who were first to erect some splended timber bridges upon this principle. They possess at the present day numerous gigantic examples of this method of construction, embodying every principle, with the exception of that of suspension, which could possibly be introduced in the erection of timber spans. It must not be supposed that the form of girder in question sprung into full developement upon its first appearance among us. Far from it. The earliest examples of wrought iron open-sided girders were erected in Ireland. We may select as a specimen of their original construction a bridge carrying the Dublin and Drogheda Railway over the Royal Canal in Dublin. However worthy of commendation as a pioneer of the new principle this bridge may be considered, it cannot be otherwise regarded than as a miserably inefficient application of it, or rather as no correct application whatever. The web wherein lies the especial value of the system, is composed of a series of thin bars closely interwoven and riveted together, so closely as to present a completely reticulated appearance, and without the slightest attempt at proportion or distribution of material, and constitutes a perfect mockery of all the laws laid down by theory for correctly designing girders of this nature. Curiously enough, about thirty miles further on, upon the same line of railway, we have in the Boyne Viaduct one of the finest existing examples of the lattice principle, where the laws of theory have been closely adhered to, and only received that modification which must always accompany their practical application. Comparing these two structures together and contrasting the total absence of all scientific principles and theoretical requirements in the one, with their full and accurate development and application in the other, it is scarcely possible to believe that the two designs could have emanated from the same individual.—*The Engineer.*

Winter on the Pacific Railroad.

Snow in scattering patches enlivened the hills around Dutch Flat, and varied the scene as we rolled along on the Central Pacific Railroad.

The further on we moved the deeper the snow became; twelve miles ahead and we were rolling on through banks of snow on either side from five to seven feet deep, the space of the track being cut out with the smoothness of the wall of your room. Along the road were scattered squads of men keeping it in repair and keeping the snow off the track.

We were now approaching Cisco, and for six to eight miles it seemed we were traveling between great gorges, as snow stood on an average six or eight feet above the tops of the cars, and in places 100 feet or more above the track, and almost perpendicular. It looked terrific—certainly grand; and to think I was on the Pacific Railroad, the boldest work of the age, added a majesty to the scene and a pleasure to the mind which language cannot convey. As you look back on the railway canal as it were, daringly cut through mountains of snow, it spoke in unmistakable language that it is only to possess the will to do, and anything can be accomplished. We soon arrived at Cisco. Here the snow, I was informed, was 15 feet deep, but I do not think it exceeded ten. This is now the terminus of the railroad, and here you take sleighs.

We jingled along gaily, all enjoying the scene and making merry, the snow still getting deeper. We were now riding on top of it, and its depth could only be estimated by the telegraph poles, which are 24 feet long. At times the wire was entirely submerged, and then the poles would stick out, it may be two, four or six feet. Now and then along the roadside you could see a chimney of some lone cabin sticking out and seeming a minature smoking volcano, or an incline tunnel cut down to some farmhouse.

We reached the summit, and what a scene! I thought snow scenes on Lake Superior were beyond competition, but the scene of the summit of the Nevada baffles all description. At this locality are a number of buildings, some entirely covered over with snow: others set up on posts, with two stories and a sharp peaked roof, have the extreme part of the peak sticking out. The snow here is from 27 to 30 feet deep, and in some places double it. The mountains are almost spotless white. Notwithstanding the depth of snow, there are quite a number of Chinamen and other individuals walking around, and who all at once at times drop out of sight, like ground squirrels into their holes. I must not forget to mention one shrewd *hombre* who rather conceived the idea that he would not be buried up altogether, and built a cabin on the top of about 20 feet of snow, propping it up as the snow falls. The probability is his real estate will fall some about next July.

There have been, about the summit, several snow slides, in one instance burying, some say 30, others 60 Chinamen. The towering, ponderous bodies of snow speak loudly, "beware of my power if I start." Snow slides, when they move, are worse than whirlwinds; they are typhoons, earthquakes and whirlwinds consolidated. They make a clean channel as they move; immense trees are but pipe-stems, and ponderous boulders are carried along as pebbles. They can be likened to shooting stars in their speed.—*Corresp. Bulletin.*

The Sacramento *Union* says of the winter's work:—The first great fall of snow was easily managed, though before the line was fairly restored, other storms broke upon the mountains, and from that time until the middle of March, the snow plows were kept in almost continual service. The winter was one of the fiercest ever known in the Sierra Nevada. Snow fell five days of one week. Yet the railroad men persisted, determined to prove that even in this terrible season, without the instruction of experience, and bothered by the settling of a new road bed, they could run trains to Cisco. It was found that with the aid of the big independent snow plows, where the track was not walled in by rock and earth, the result of the heaviest storms could soon be cleared away, the bulk of the snow being thrown into the ravines. The greatest difficulty was in the deep cuts. The freight cars which came into Sacramento loaded with snow, have borne witness to the kind of work done in clearing them. The railroad men have decided on covering the cuts, and have adopted a plan for strong roofing structures.

ECLIPSE OF JUPITER'S MOONS.—On the 21st of August next a celestial phenomenon will be witnessed which has only twice before been recorded in history. The planet Jupiter will at that date be seen unaccompanied by her satellites for nearly two hours. Of her four moons three will be invisible on account of their passing simultaneously over Jupiter's disk, and the fourth will be immersed in the shadow of the planet.

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Editorial Summary.

THE STEAM GUN CARRIAGE.—A further trial of Mr. Ead's gun carriage was made on the 18th ult., in the presence of Admiral Farragut and a number of high officers of the army and navy. Twelve shots were fired (with the 15-inch gun) in exactly 16 minutes. The steam shot-elevator had been deranged in some manner, and was not used: in consequence of which, the inventor thinks, the firing was not more than half as rapid as it might have been. The steam check to the recoil was tested with a number of heavy discharges, one man controlling the gun with ease. The pressure created in the cylinder by the heaviest charge was between 750 and 800 lbs. to the square inch. The heating of the gun with this rapid and heavy firing, was very slight—an important and rather unexpected result. The interior surface, as far as the arm could reach, was barely warmed, and the exterior seemed as cool as before. Greater confidence is now felt in the endurance of these great guns, than ever.

EARTH WORMS.—Another correspondent adds the testimony of his own observation, to the curious mode of eating grasses and leaves, detailed in a communication which our readers will remember. He adds one or two curious observations further:—"The worm exudes a transparent, sticky substance, which serves it for taking hold on objects to be conveyed to its hole, and also as a means of finding its way back to the hole, by the slimy trail. Although the worm cannot see, it can hear very well; a very moderate noise at the distance of three feet causing it to contract and attempt to hide. It would also seem that the worm is very sensitive to warmth. With a small stick I could touch it before it was aware of anything being near it: but in cautiously putting my hand toward a worm, it would contract its body when my finger was an inch from it. It would seem from this that the warmth of my hand made the worm aware of its approach."

THE COMMON SNAIL, which seems like little more than a jelly, is furnished with quite a firm jaw of a crescent shape, on the upper lip. In some species this jaw has a slight smooth projection on the cutting edge, and in others it is notched. It is capable of biting through the leaves of lettuce or cabbage, and when feeding, the nipping sound of the bite can be heard, and the little semicircular cuts on the leaf are distinctly seen. But the more curious part of the eating apparatus, is the tongue with which the snail laps its softer food, and which is also furnished with sharp, hooked, rasping denticles to the incredible number, in some species, of nearly 12,000, arranged in regular longitudinal and transverse rows, on a bit of membrane not a quarter of an inch long and half as wide. A wonderful vitality is found in these creatures for reproducing portions cut away, and sometimes even the head grows again after decapitation.

COPPERING IRON HULLS.—A correspondent calls attention to Barnard's (American) patented mode of coppering iron hulls, by means of rivets headed in a chamber reamed out within the thickness of the iron with a one-lip drill: the sheathing being laid in a patented insulating paint and cement. He states that Mr. Barnard went to France in 1864 at the instance of the Government, to superintend the sheathing of one of its iron hulls in this way, and asks if we have not confounded Barnard with Bernabe. By referring to our original notice, it will be seen that Bernabé's patent is even more distinct from Barnard's than his name: being of the kind the French call *galvanoplastique*, and relating to the chemical precipitation of copper upon iron.

MISCELLANEOUS.—Americans in China have secured for American steamboats the exclusive use of two of its rivers. The British there cannot furnish the equal of our boats in speed, and so have been shut out, which has awakened quite a breeze.——An ordinance for paving a portion of Seventh Avenue, New York City, with the Stafford (wooden) pavement has been passed by the Common Council. The Mayor's decision is reserved.——The first steam fire engine in China arrived there in March last, and does so well that more are about to be ordered.——The population of London is estimated by the Registrar General at 3,082,372; Liverpool, 492,439; Manchester, 362,823; Birmingham, 343,948.

GREAT ESTABLISHMENTS.—The French have a notable genius for mammoth incorporations in manufactures as well as finance. Their great industries are consolidated in fewer and vaster establishments, relatively, than in any other manufacturing country. The celebrated works of Schneider & Co., Creusot, turn out one eighth of the whole iron product of France, and employ 10,500 workmen. Chatillon yields one twelfth, with 8,900 workmen; Petin, Gaudet & Co., a still larger proportion, with 7,000 to 8,000 men.

THE PRUSSIAN Navy is set down by a French journal at 78 ships carrying 453 guns; two being iron clad. But British builders are now making for Prussia at least three powerful plated ships of war. Mr. Reed, chief constructor of the British navy, who furnished the model for the Wilhelm describes that vessel as the most powerful ever laid down in any country. She is nearly 6,000 tuns burden, with 1,150 nominal horse-power, and has iron armor plating 8 inches thick.

NEW WAY TO MAKE POTASH.—A process hitherto confined to the laboratory, has been introduced on a practical scale by M. Tessié de Mothay, advantageously replacing sulphuric by fluosilicic acid in the manufacture of potash. The acid is obtained from carbon, silex, clay, and fluoride of lime, melted in a blast furnace.

INDIUM.—This new and scarce attainable metal has been produced in decidedly perceptible quantity by M. Reichter, who first succeeded in isolating it. M. Reichter lately presented to the Paris Academy of Sciences two prism-shaped specimens of indium, about four inches long, with sides one-half and three-fourths of an inch wide. It is obtained in faint traces, in a precipitate derived from the solution of zinc in sulphuric acid. Its presence in zinc and its close resemblance to cadmium, which also accompanies the ores of zinc, have led to the conjecture that these two obscure metals are the same. The distinctive traits of indium, however, leave no doubt upon this point, its only known oxide, unlike that of cadmium, being insoluble in ammonia, and its spectrum being distinguished by a bright indigo ray. Its color, smell and other properties somewhat resemble those of tin.

SELLING OFF THE IRON CLADS.—The money articles inform us that ten millions of francs in foreign exchange made their appearance in our market the other day, in completion of the purchase money of the *Dunderberg*. With the preceding instalment, it is understood the builder realizes something over $3,000,000 currency.—It is also understood that the French Government has completed the purchase of one of our smaller iron clads, now in European waters, and that five million francs further will presently rejoice the heart of Wall street.—The Japanese Commissioners, it is reported, are to purchase the ex-rebel iron clad ram *Stonewall*, if a survey proves satisfactory, for $400,000.—Finally, it is rumored that Russia takes the *Miantonomoh* and a few other unconsidered naval trifles, on general account. We have a few more left for prompt applicants—"selling out to make room for new stock."

——We regret to observe that the prize of $20,000 offered by the French Academy for a solution of the nature and remedy of Asiatic Cholera, has not been won. A nnmber of gentlemen were awarded partial prizes for valued contributions to the object.——Philadelphia boasts the largest music hall on the continent. Horticultural Hall, just opened, measures 75x 200 feet, giving 15,000 square feet of floor. The Boston hall has 10,206 square feet, Irving Hall, New York, 9,375, and Steinway Hall 9,125.

GLASS PRINTING.—De Mothay has prepared an ink for printing on glass by means of rollers similar to those used in calico printing, after which the glass is subjected to heat and the picture is vitrified and fixed in the glass, without producing any distortion or imperfection. Many thousands of plain patterns and mosaics of stained glass produced by this process at a very cheap rate, are already in use for the decoration of church and other windows. The colors are mixed with a solvent of a silicate or silico-borate of potash and lead, as usual in painting on glass, and this composition rendered plastic by resin in turpentine, is applied thickly to the rollers and transferred to the glass, after which it it is vitrified in the usual manner.

FLAT STREET RAILS.—The obstinate prejudice of the English against street railways, leads to a discussion at present of a compromise plan. It is proposed to lay two pairs of nearly flat rails with a slight depression centrally for omnibus wheels, and a guide rail midway for the driver to sight with the pole of his carriage, so as to keep the track. The suggestion is not new, but it is worthy to be thoroughly tried and perfected. We shall not have the perfection of city travel, until a public roadway free to all, to which ordinary vehicles may be adapted, offers no resistance to the movement, turning out and passing of conveyances.

PHOTOGRAPHY IN 1787.—In a book printed in 1787, entitled "Rational Recreations in Natural Philosophy," by W. Hooper, M. D., occurs a paragraph headed, "How to print letters by sun light." The directions given are, to fill a glass decanter with a solution of silver, mixed with chalk and aquafortis of the consistency of milk. Then having pasted paper models of the shape desired, on the outside of the decanter, and placed it in the sun, the glass will turn black, leaving the space occupied by the paper white. In 1802, the action of light upon silver salts was applied to producing images of leaves, lace. etc., on white leather or paper, by Wedgewood and Davy.

A MONUMENT TO PROFESSOR BACHE is projected at Washington, and a committee, including his successor, Prof. Peirce, Prof. Henry of the Smithsonian Institute, Admiral Porter and other distinguished gentlemen, are moving in the matter. The Boards of Trade in the seaboard cities, realizing the obligations of commerce to the man who made the Coast Survey what it is, are coming forward to second and promote the proposal, which will no doubt be promptly and properly carried out.

CONCILIATION.—A clergyman's mode of rat catching as described in an exchange, is worthy the attention of Mr. Henry Bergh. He uses a wire cage trap, and when a rat is caught, instead of incontinently killing him, he treats his prisoner liberally with food and drink, until he is fat, tame and contented. Others will then crowd in to share his good fortune, (if he is not large enough to drive them away) and may be removed at leisure and despatched.

THE THIRD ANNUAL EXHIBITION of the Middlesex Mechanics' Association will be given Sept. 10, 1867 at Lowell, Mass. For further information address Hocum Hosford, Superintendent, at the corner of Middle and Shattuck streets Lowell, Mass.

THE ADDRESS of Lamb Cook & Co., manufacturers of Oliver A. Kelley's water wheel governor, illustrated in No. 19, current Vol., page 296, is at Slatersville, R. I.

A Dam Built in Midwinter.

Among recent engineering operations, the construction of the dam at Turner's Falls, Mass., on the Connecticut river, in the depth of winter, is somewhat interesting. The channel being divided by an island, the work, a dam of 23 feet in hight and 900 feet in length, was built in two sections, one after the other; an opening twelve feet lower than the dam and 200 feet wide having been left in the middle of the first section, for the passage of the current while the second section was building. But before the second section had been completed (which was done by the middle of December last) a freshet brought down a raft of timber against a wooden barrier erected to guard the opening left in the first section and to facilitate finally closing it, and sweeping away this structure, tore out the foundations of the dam below the opening, down to the bed rock, for a breadth of about 110 feet.

This breach must be repaired at once or the whole remaining work was liable to be swept away by a freshet at any time in late winter or spring. The ordinary flow of the river through the breach was 5 to 8 feet deep, with a velocity of 10 to 12 feet per second, and a volume as estimated, of 5,000 to 10,000 cubic feet per second. To turn the water out of this channel, that the masonry might be laid in its bed, a provisional dam was constructed of timber cribs, bearing against the stream in the form of an arch, and spanning horizontally the breach. The first crib or pier was towed into position on the 31st of December, and sunk by filling with stone. Ten such piers were placed at equal distances, ends against the current, as radii in a segment of a circle, and the last was in position on the 16th of January, 1867; the current still flowing freely between them. The passages were now to be closed by a second set of piers, tapered to fit the convergence of the first set, and serving at once to key and fill the arch, which then presented a front to the current only consolidated the more, the greater the pressure brought against it. The last of these plugs was put in on the first of February. Nothing remained but to fill in and tighten the barrier, after which the dam was laid in perfect security, commencing March 1st and finishing on the 22d of that month. The work of filling in was interrupted by high water for a few days in the middle of February, and two piers had been lost while floating them to their places, by the breaking of guys: but with these exceptions no mischance occurred, and notwithstanding the severity of the season and the arduous nature of the work, no loss of life, personal injury or unusual sickness was suffered among the seventy men employed. Both the process and the result reflect great credit upon the agent, Mr. Geo. W. Porter, and the superintendent, Mr. A. P. Richardson, who jointly devised and managed the plan.

Amber.

Amber is found on the southern shore of the Baltic, where it isc ast up by the action of the groundswell after the northerly gales. It is also found on the coast of Sicily, on the Adriatic, on the English cost Norfolk and Suffolk, and at Cape Sable, Maryland. Mining for amber in beds of brown lignite is carried on in Prussia, and it is found in excavations all over Europe. Still amber continues to be the "gem of the sea," by which it is yielded only after a storm, and in such small quantities that its value has ever remained undiminished.

Amber is found in masses, irregularly shaped, and usually of small size. The color is of all shades, from a pale straw to deep orange. It is brittle but can be easily cut with a sharp knife, it is the opinion, and is only an opinion that it is simply an exhuded vegetable juice. Baron Leibig thinks it probable "that amber is a product of the decay of wax, or of some other substance allied to the fixed oils." Sir David Brewster says that amber is an indurated vegetable juice. Wood, leaves, flowers, and fruit have been found inclosed in amber, and recognized as having belonged to coniferous trees now extinct.

Sicilian amber is usually of a deeper color than that from the Baltic, and it is said that in Germany an experienced amber worker can determine the locality of amber from difierences in its appearance. Neither is it invariably found in a hard state. An instance is on record of a gentleman having received from a friend living on the Baltic coast a piece so soft as to take an impression of his seal; and another piece is described as soft on one side and hard on the other

The uses of amber are not very numerous. As a material for art carving nothing can be more beautiful. The principal market is Constantinople where it is made into pipe mouthpieces, and articles of female adornment in the shape of beads. The Turks and Armenians are said to be fine judges of amber, and the bazaar at Stamboul, where the amber workers are located, is full of interest to the connoisseur.

The only purpose to which it is applied in the useful arts is in the manufacture of varnishes for carriage builders and photographers. That used for carriages is expensive, and is a long time in drying, but it is the hardest and most invulnerable of any known varnish.—*Providence Journal.*

Crystallized by Concussion.

A circumstance apparently confirmatory of the disputed theory of a molecular change in iron from mechanical shocks, is related by a correspondent at Underhill, Vt. He says that an old relic of the Revolution, a French gun barrel, which had been refitted with new stocks and locks several times, after standing fire perhaps the millionth time, burst, and in such a manner that every one who saw it pronounced it to have been originally a cast iron barrel, until an old iron maker convinced them by showing the weld on the under side. But the appearance otherwise was exactly like cast iron, and brittle at that. Mr. E. attributed the change in the iron to the action of the sulphur in the powder and its long use and many times repeated action.

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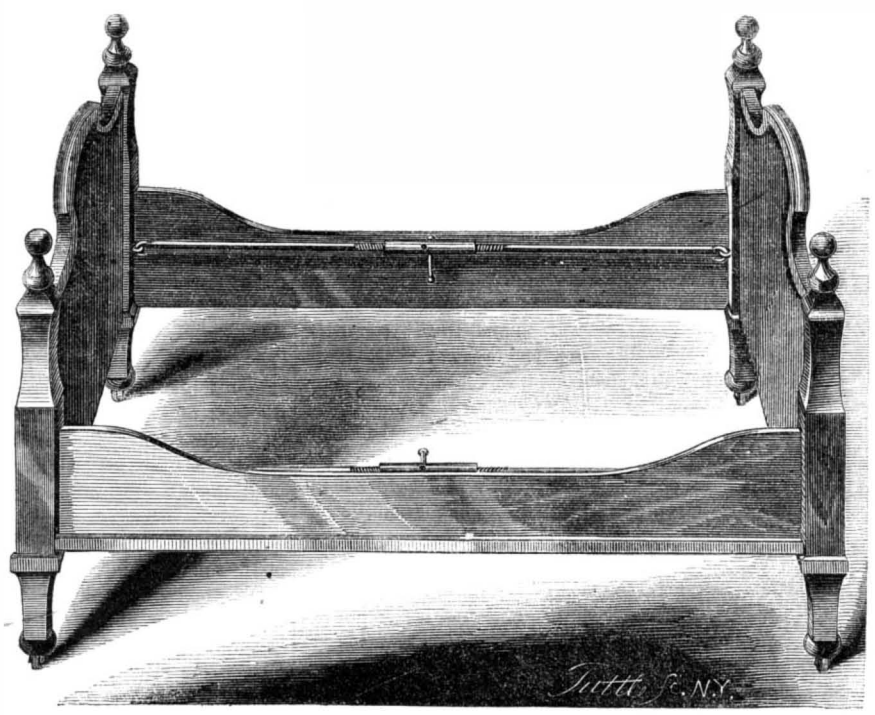
Improved Bedstead Fastener.

Bedsteads which are secured by means of screws offer great facilities for the hiding of the vermin which find their favorite retreats in the apertures thus left for their convenience. Various other methods of fastening have been devised, but where recesses are made in the posts or bars the bedbug is sure to ensconce himself, even if the crack through which he passes will scarcely admit a thin knife blade. The one shown in the engraving has all its parts exposed and does not require any mortising or boring of the wood. It is simply a double bar or rod on each side of the bedstead, inside the side pieces, the outer ends of which are formed into hooks which engage with staples in the posts, and the other ends of which are connected by a screw sheath. The end of one of these half bars is threaded with a right-hand screw and the other with a left-hand screw. The coupling has a lever, knobbed on each end, that passes through its center, by which the two rods are screwed up and the frame of the bedstead tightened. These rods also form a support for the ends of the slats, making a spring-bed bottom.



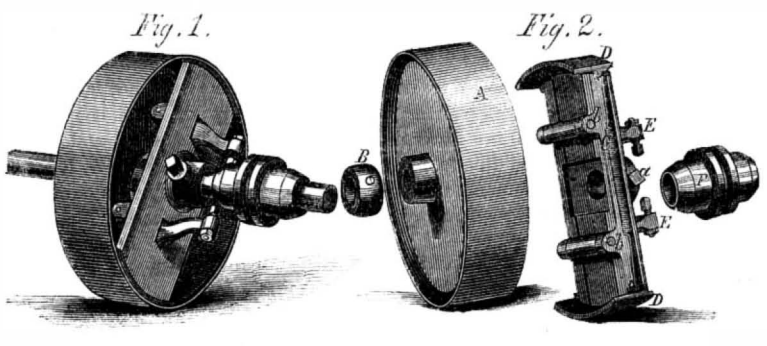
COCHRAN'S IMPROVEMENT IN FASTENING BEDSTEADS.

The device is so simple that no further explanation is necessary to convey a proper idea of its construction and operation. It was patented through the Scientific American Patent Agency, April 23, 1867. For further information address the patentee, George G. Cochran, 95 Powers street, Brooklyn, N. Y.

Improved Friction Clutch Pulley.

In almost every workshop much trouble and annoyance is occasioned by the derangement and noise of friction and clutch pulleys. While these difficulties may often be caused by defective workmanship, it is more frequentiy the case that the pulleys are of imperfect construction and therefore unfitted for long continued or constant use. A friction clutch pulley is shown in the engraving which it is believed will be found, both in principle and in execution, free from the almost universal objections existing in pulleys of this class.

Fig. 1 represents a complete friction clutch pulley in working position upon a shaft. Fig. 2 represents the parts of the same. A is a pulley, the inside surface of the rim of which is turned. This pulley revolves freely upon the shaft and is kept in position on one side by the collar, B, and on the other by the segment plate, C. The segment plate, C, is fastened to the shaft by the set screw, *a*. Attached to this plate and sliding in planed grooves are two segments, D D, which move in opposite directions at right angles to the shaft. The outer surfaces of these segments are turned to the same diameter as the inside of the rim of the pulley, A. The two levers, E E, are connected to the segment plate, C, by pins passing through them and the ears, *b b*, which act as fulcrums. These levers pass through and are fitted to the segments, D D, and also through the segment plate, C. In the outer ends of these levers are adjusting screws with set nuts. Fitted to and sliding upon the shaft is a thimble, F, the end of which is turned a conical shape. Upon the outside of this thimble is a groove into which a shipping fork is fitted. It will be readily seen that when the thimble is pressed forward toward the pulley the conical end comes in contact with the rounded heads of the adjusting screws by which the two levers, E E, are forced outward carrying the two segments, D D,which movement brings the faces of these segments into contact with the inside of the rim of the pulley, binding the surfaces together, and thus communicating the motion of the pulley to the shaft. This pulley is perfectly noiseless as well as simple and efficient, with no liability of locking or unlocking except at the will of the operator. Those interested can address the manufacturers, J. R. Brown & Sharpe, at Providence, R. I.



BROWN & SHARPE'S FRICTION CLUTCH PULLEY.

MAINE AND HER PUBLIC WORKS.

The remarkable vigor and unity displayed by the people of Maine in developing the great natural resources of their territory, point to a future of eminent—who knows but pre-eminent?—prosperity. We have occasion almost weekly to note fresh instances of manufacturing enterprise called into existence, and sometimes coming when called, all along the magnificent descents of her many streams, by the liberal votes of township after township. The state and township activity in railroads is equally noteworthy. All towns are allowed by law to take stock in railroads to the amount of five per cent of their valuation, beside special authorizations for larger subscriptions. This permits the whole property of the State to be taxed by town votes at least five per cent for the grand purposes of internal improvement. A very healthy and important characteristic of railroads built on this plan, is that so far they become public property—belong to those who give them right of way and are to use and support them—and are in the natural way to become what roads of all kinds ought to be, free highways.

The same privilege is granted to towns in the adjoining State of New Hampshire, and will doubtless operate powerfully there also upon the progress and ultimate destiny of the system of roads passing through both states in common. In Maine, however, these as well as local lines find their conception, and inception, and main impetus, and receive liberal exemptions from taxation, and direct subsidies, at the hands of the State.

In 1860, says the *Railroad Journal*, the total length of railroad within the state was 472 miles, costing $16,576,385. In 1866—less than two years later, leaving out the war—the miles were 509, beside the Portland and Montreal line from the state boundary to Island Pond, 71 miles, built entirely by Maine capital, and the total cost (correcting the *Journal's* misprints) was $22,104,845. This resumption of progress is but a small instalment of a system of public works which challenge general interest by the courage and liberality they display. We mention the principal features.

The European and North American Railway, from Bangor to St. John, New Brunswick, is a line of 194 miles, 84 in New Brunswick and 110 in Maine. The Government o New Brunswick gives $10,000 per mile within its domain as the work proceeds. To the Maine line, the State proposes to contribute from the funds expected from the United States in payment of claims, and has also appropriated a valuable tract of public lands. The city of Bangor has voted to loan its credit for $1,000,000, beside $500,000 to the Piscataquis branch reaching the slate quarries at Brownsville. Work on the main line is in active progress, and a large proportion of the expensive work on the two terminal sections has been accomplished. Track laying was to be commenced about the first of this month, and 55 miles, or half the road in Maine, is to be opened within the present year.

Portland votes $700,000 to the Portland and Ogdensburg, passing through New Hampshire to the Vermont system of roads and completing the line to Lake Ontario. St. Johnsbury, Vt., aids to the amount of $200,000, and Messrs. Fairbanks subscribe $150,000. The Maine Central Extension, from Danville Junction to Portland, is regarded as certain to be built within a few years at farthest.

The line from Bangor to Winterport is under survey.—That from Newport to Dexter is provided with capital and already leased to the Maine Central.—From Belfast to Newport the towns are authorized to subscribe 20 per cent of their valuation to the stock of the Belfast and Moosehead Lake Company, and a number of them have already voted their quotas.—The Somerset road, from Waterville to Solon, is to be built by the towns on its route, several of which have already filled their quotas.—The city of Bath subscribes $123,000 to the stock of the Knox and Lincoln road, and lends $100,000 on condition that the road shall terminate at Bath. In all, according to the railroad contemporary from which we have derived in substance most of the above facts, the length of new road in progress or contemplation amounts to 458 miles, and will nearly double the present system within the state.

Menhaden Oil Manufacture.

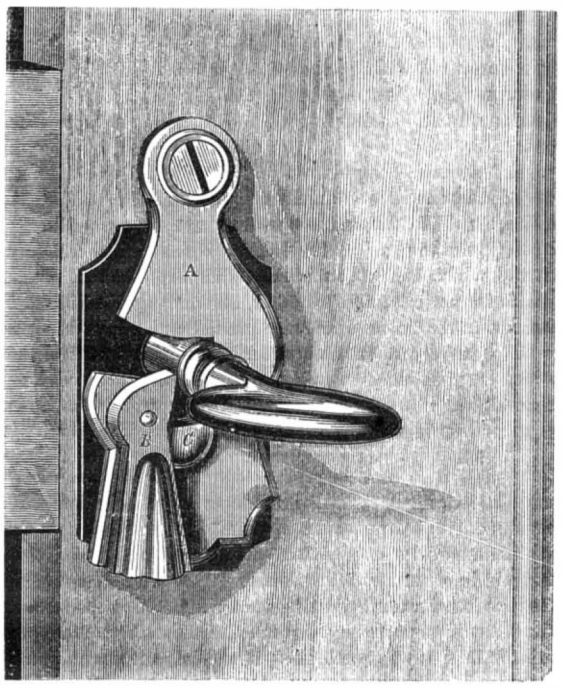
A correspondent in Braintree, Mass., who is well informed on this subject, gives us the following particulars. It will be seen that this branch of business is quite extensive and important: Menhaden oil is extensively manufactured at stations the whole length of the sea coast of New England, beginning at Connecticut and extending as far north as Frenchmans Bay, in Maine.

Beside those in Narragansett Bay there are works at Cape Cod and Cape Ann. In one district Waldoboro, in Maine there are ten establishments with an average capital of five thousand dollars, employing some one hundred men. On Penobscot Bay there are several extensive works owned by Boston capital. There are also some twenty vessels fitted out for the business from the state of Maine, having their furnaces and presses and doing all the work on shipboard.

There is scarcely a town on the sea coast below the mouth of the Kenebec, where menhaden oil in some measure is not manufactured. Near Bristol, R. I., are the extensive works of the Naragansett, Atlantic and Neptune company with a capital of $40,000 and a number of others of lesser note."

MAY'S PATENT KEY GUARD.

A favorite operation of the burglar is facilitated by the carelessness of householders in leaving the key in the lock on the inside, when it may be readily turned by seizing the point with key nippers and turning it in the lock. Yet if the key is taken out there is no obstacle to the use of a skeleton. To overcome these objections and furnish a retreat from this dilemma is the object of the device under consideration. It was patented March 12 1867, through the Scientific American Patent Agency, by Franklin J. May assignor to himself and J. G. Barnum. The key plate, A, may be pivoted either to the lock



or the door. It resembles an ordinary key plate, except that it has a slot cut from one side on a radius struck from the center of its pivot. To one side of the key-plate, beneath the slot, is pivoted a weighted pawl, B, the weight of which keeps it always in an upright position, except when swung to one side by the hand. When in position and the key is in the lock the upper point of the pawl comes against the shank of the key, which at the point where the key-plate slot engages with it, is flattened. It will be seen that as the slot is not wide enough to allow the cylindrical part of the key shank to turn, but fits only the flattened portion, so long as the key plate covers the hole the key cannot be turned. But by inserting a wire or other properly shaped implement from the outside the burglar might swing the key plate to one side. To prevent this is the office of the pawl, B. This, by means of a stop, C, can be swung only in one direction—the weighted bottom away from the key-plate—so that it securely prevents the movement of the plate while the key is in the lock.

It can be attached to locks of all sizes and shapes; it is made of various styles to suit all descriptions of lock, being japanned, bronzed, polished, or plated; the cost is trifling, and its durability equal to the life of the lock. The patent right is for sale. All communications should be addressed to May and Barnum, 74 Bleecker street, New York City.

Hints.

Mr. Rowland Hill, of Richmond, Va., gives this handy rule for ascertaining the area of a circle, when the diameter and circumference both are known and the decimals not remembered: "Multiply the circumference by the diameter and divide the product by 4. The quotient will be the area." We have tested this rule and find it correct. It is worth remembering.

He says again: "When the hinges of a door are not in a vertical line the door exhibits a perversity in remaining either closed or open, which to a good housewife is vexatious. I have often wondered that this obedience to the law of gravitation was not made use of by some of the inventors of self opening carriage gates."

We think it has been applied to this object, but cannot at present refer to the particular case. Common gates and doors which open either way are hung on hinges not in a vertical line.

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STEAM BOILERS---THEIR FORM, CONSTRUCTION, AND MATERIAL.

NUMBER SIX.

Although the attention of engineers, mechanics and others has been directed towards endeavors to acertain the cause, or causes of boiler explosions ever since the introduction of steam as a motive power, it does not yet appear that their efforts have been crowned with very marked success. This result, or want of result, is no reflection upon the ability of those engaged in prosecuting these inquiries; for the circumstances attending explosions are so varied, and even contradictory, that the attempt to single out any one as an adequate cause for all cases must be futile, and it would almost seem that every case must be treated separately. Absence of water, overheating of plates, uneven firing and feeding, corrosion and wear from long use, weakness of form, and imperfection of workmanship and material are each offset by conditions of exactly the opposite character, and under every one of these conditions boilers have exploded, if human testimony can be relied upon.

Under such discouraging circumstances the task of detecting the causes of explosions and suggesting the means of prevention is an exceedingly difficult one. When boilers explode while under the charge of skillful and competent men, it would seem that the causes must be limited, or nearly so, to weakness of form, imperfection of material, or poor workmanship. The first of these has been treated in previous articles. It is manifestly necessary, even if one form should be determined upon as the strongest, that it should be modified to suit varying localities and uses. That which would answer admirably for stationary purposes might be wholly unfit for vessels, and boilers adapted for river boats might be unsuitable for sea going ships. None of these forms would do for the locomotive. We are aware that the Harrison boiler is claimed to be adapted to all situations except the last, and similar claims have been made for others; but these claims have not as yet been generally acknowledged, and we do not propose to discuss them. The broad statement may be honestly made that a form of boiler specially adapted for steam driven vessels is not a form well fitted for stationary uses nor for the railroad. As, therefore, no one shape can be adopted for all purposes, the only remedy for weakness of form is judicious staying.

Imperfection of material must be acknowledged as a prolific source of explosions. The practice of testing the finished boiler by hydrostatic pressure is an exceedingly expensive and, in our opinion, not a satisfactory one. If the boiler fails under the test, either it must be taken to pieces and the whole material condemned, or, as is generally done, the defective plate must be removed and another substituted. If the first course is pursued, injustice is done to the boiler maker and the iron manufacturer; for it might be that the larger part of the material used was what it should be, and if the latter course be taken the purchaser may be the loser; as a boiler which has been so strained as to show its weakness suffers some deterioration, and may have been tested closely to the rupture, while the new plate which replaces the old one may be in an entirely different condition. The test should be made on the iron before it is put into the form of a boiler, and then the test on the boiler itself would be made simply to detect faults of construction. It is not seldom the case that the iron which composes a boiler shows no defect under the severest hydraulic test, but when heated and exposed to the pressure of steam, blisters and cracks exhibit themselves to the gaze of the surprised engineer. Such a preliminary test is proposed by the plan of Richard Montgomery of this city, who corrugates the plates of which a boiler is composed by running them between rollers having circumferential depressions, the cross sections of which exhibit alternately a concave and a convex form. The plates are evenly heated to a bright, cherry red, and then passed between the corrugating rollers, coming out either straight, or, if desired, curved to correspond with the diameter of the boiler. By this method it is claimed the quality of the iron is tested, inch by inch, as it passes through the rolls, so that if any flaw or imperfection exists it will be revealed by the trial. Only the toughest and most homogeneous iron can stand such a test, although the question might be raised whether the iron might not suffer some deterioration from it. The corrugations are about two inches from point to point, giving immense rigidity to the iron and increased heating surface. This plan of testing boiler iron appears to be well adapted to the detection of poor material. It is certain that corrugating iron adds greatly to its rigidity and power of resisting pressure.

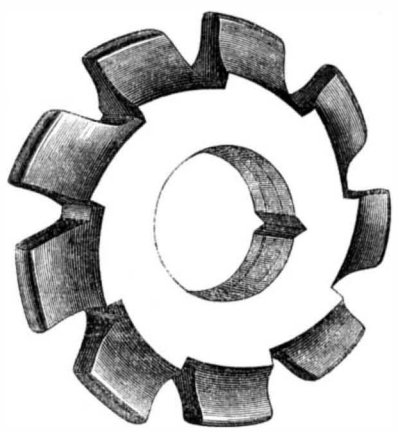
We recommended in No. 5, current Vol., page 69, such a device for strengthening boiler flues, copied from the London *Engineering*, an illustration of which we furnished, giving our reasons for our favorable opinion. If in this case it was—as had been proved—an advantage, why should it not be when extended to the construction of the entire boiler?

Poor workmanship may be called another one of the causes of boiler explosions. Calking with the sharp edged "set" or chisel is often improperly done and the sheet is indented and partially cut through by its injudicious management. The percussion of the hammer transmitted through the chisel will more or less change the texture of the iron and assist any tendency to weakness. The introduction of stays is not always properly managed. Sometimes they are put in as closely as may be, where there is no real need of their services. Every one furnishes a nucleus for the accumulation of scale and it is in these spots where corrosion most readily takes place. In punching the holes for rivets, carelessness or ignorance allows such aberrations that in some cases half the diameter of one hole may overlap the other. Then the "drift" or the reamer is introduced and a rivet put through, the shank of which does not half fill the irregular or enlarged aperture, and the whole dependence of the workman is on the head and riveted end. Manholes cut out of a plate without strengthening rings around them are simply invitations to a rupture. Patching old sheets with new plates and drawing them to place by screw bolts is another fault which must sooner or later show deleterious results.

But there is one cause of boiler explosions to which we have not adverted. That is the custom of purchasing old or discarded boilers to do new work. If a man purchases an engine without a boiler he casts about to find a boiler large enough, and, above all, cheap enough for his purpose. In both respects he can be easily suited. Knowing, perhaps, nothing himself about a boiler, he ventures upon the precarious ground of receiving the statement of the would-be seller because by so doing he may save a few dollars. He buys a boiler perhaps honeycombed internally by corrosion but fair outside, and sets innocent men to work about it. An explosion occurs and the jury of inquest over the victims of this man's credulity or criminal ignorance brings in a verdict of death from accidental explosion. The sale of boilers ought to be regulated by law as well as their manufacture. If they are of good material, good form, good workmanship, and in good condition the purchaser ought to know it and if not the seller or manufacturer ought to suffer for it.

BROWN & SHARPE'S CUTTER FOR THE TEETH OF GEARS.

While improvements have been made in almost every other tool in common use, there seems to have been no change for the better in the construction of cutters for the teeth of gear wheels, which as every machinist knows, are troublesome and expensive to make, and last but a short time, as they soon become dull and then require to be annealed, re-cut and hardened again, the cost of which is nearly equal to that of making new cutters, while the steel is liable to injury from repeated heating.



To overcome these difficulties a cutter has been made as shown in the engraving, by constructing the teeth or blades in the form of segments or curvilinear sections that are mechanically accurate in outline and of equal size and contour throughout their entire length, each of which has a sufficient circumferential inclination with respect to the revolving circumference of the cutter to produce the proper degree of clearance, so that the tooth may be sharpened by grinding away its face until its strength is permanently impaired, and so that it will always present the same cutting contour, each new face and cutting edge produced by grinding being a fresh radial section of an equi-form tooth throughout its whole length.

A cutter made on this plan will outlast many of the old form with the advantage of being always ready for use. If, as frequently happens, the cutter becomes dull before a wheel is completed, it can be taken out, sharpened and returned to its place in a few moments without any risk of altering the form of the teeth to be cut. From want of knowledge of the true principles of gearing or from want of practice in their application many machinists would prefer to purchase cutters rather than to be troubled with making them, especially if they could promptly procure a superior tool at a reasonable price. Those interested can obtain further information by addressing the manufacturers, J. R. Brown & Sharpe, at Providence, R. I.

EXPOSITION NOTES.

A MODEL is exhibited in the French department, of a mine elevator, or a sort of a car pump. A continuous frame reaches to the bottom of the shaft, furnished with catches for the cars at regular intervals. The whole frame rises and falls like the piston of a pump; at each rise bringing up each car caught upon its hooks, the distance of the stroke, and lodging it upon stationary catches, from which it is again taken and elevated a further stage by the next stroke, and so on to the top. The arrangement involves a heavy and extraordinary addition to the weight to be raised.

A WHOLE WELDED BOILER from Dusseldorf is exhibited in the Prussian annex. A steam dome is welded upon the boiler, and so accurately and smoothly is the whole work done as to be hardly distinguishable, superficially, from a casting.

THE ANNULAR BAKING FURNACE invented by Hoffman, of Berlin, is on exhibition. The annular space is divided into compartments, so arranged that the hot draft from the baking of one set of bricks or earthen ware passes into the next compartment to dry another charge, and thus travels the circuit until exhausted of its heat. While the next charge is being burnt, the draft of air therefor is passed through the last-burned pile, cooling the latter and carrying its heat into the adjoining fire. The coal is introduced in fine dust through small orifices in the upper part of the oven, and consumed before it reaches the oven floor.

A MILLSTONE, from Paris, embodies a bolting sieve: radial pieces of wire gauze being let into the nether stone at intervals, through which the flour passes, while the bran is carried to the outer edge.

A UNIVERSAL EVAPORATOR, from Paris, consists of a series of hollow copper disks on a hollow shaft, through which steam, at a high heat, is passed continuously through the whole interior. These disks, all dipping in a trough of the liquid to be evaporated, and revolving, carry a constant film of the liquid upon their hot exterior, which of course passes rapidly into vapor. The plan is not novel. We notice that Mr. H. F. Schroder, of Cincinnati has just re-invented one for the benefit of our sorghum farmers.

EVELYN'S STERN PADDLE (England) consists of a horizontal oar blade, placed transversely to the stern of the ship, and moved up and down in the water; feathering of course to an opposite pitch at each change of direction.

A TWELVE-CHAMBER PISTOL (Paris) has its chambers in the periphery of a vertical wheel, which is so easily removed and and replaced, that an indefinite supply of ready-charged wheels may be carried and used in succession. An old idea but a good one if successfully applied.

A NEW NAIL-CUTTING MACHINE is exhibited by the Wickersham Nail Company, of Boston. In the usual machinery, the plate is turned over alternately to right and left, with manual dexterity, by the feeder, in order to compensate at each cut for the unequal depth taken between the head and point of the nail. To enable the plate to feed directly forward, is a desideratum upon which much inventive pains have been expended by different parties. This machine acts with ten cutters inclined alternately so as to cut alternate nails, "heads to points," and cuts eight nails at a stroke, and nearly 1000 per minute, feeding almost automatically.

TAKEN IN.—The English begin to suspect that they are tricked in the exhibition of war material at Paris. They find that while they have freely showed their hand, placing the best results of their ingenuity and lavish expenditure at the service of all who choose to take drawings and specifications of their ships, guns, and projectiles, other nations, particularly France, have been careful to expose nothing that is of the slightest novelty or consequence. They feel as if their rivals had got the substantial advantage, by leaving them the empty triumph of "walking over the course."

WORKINGMEN'S EXCURSIONS are organized by a Workingmen's Exhibition Committee, in London, which has obtained from the Imperial Commission the use of a large building, comfortably fitted up for the accommodation of the visitors (to be not less than 200 per week), and has made such arrangements for transport, etc., that the entire expense of seeing the exposition for a week (meals excepted) would be only about $7,25.

SUCTION OF WELLS, is a principle patented and illustrated by M. A. Donnet, civil engineer, of Lyons. By closing the well air-tight, and exhausting the air, the water currents reached by the well will be drawn upon, together with their branches and remotest connections, with considerable force, and the flow of water, where insufficient, will be materially increased.

A GREAT H-GIRDER is exhibited from the Chatillon forge, measuring 3 feet 8 inches deep, 1⅛ inches thick in the web, and 12 inches wide in the flanges. The same establishment sends another gigantic beam 110 feet long, 8⅝ inches deep and 4½ inches across the flanges, and exhibits a short strip of 3-in. L-iron, only 140 feet long.

New Recipes.

WHITEWASH AND STARCH.—The *Chemical News* promises that a strong solution of sulphate of magnesia will give a beautiful quality to whitewash, and a little of it used with starch will add considerably to its stiffness and render cotton or linen garments to a certain degree incombustible.

BLEACHING GLUE.—Soak in moderately strong acetic acid for two days, drain, place on a sieve, and wash well with cold water. Dry on a warm plate. This method is given in *Dingler's Journal.*

CEMENT.—A cement particularly adapted for attaching the brass work to petroleum lamps, is made by Puscher, by boiling three parts resin with one of caustic soda and five of water. The composition is then mixed with half its weight of plaster of Paris, and sets firmly in half to three quarters of an hour. It is said to be of great adhesive power, not permeable to petroleum, a low conductor of heat, and but superficially attacked by hot water. Zinc white, white lead or precipitated chalk may be substituted for plaster, but hardens more slowly.

WELDING COMPOSITION.—For iron or steel or both together, calcine and pulverize together 100 parts iron or steel filings, 10 sal ammoniac, 6 borax, 5 balsam copaiva or copæiba. One of the pieces is to be heated red, carefully cleaned of scale, the composition is to be spread upon it, and the other piece applied at a white heat and welded with the hammer.

DRILLING GLASS.—To the old mode of boring glass with a file wet with oil of turpentine, a correspondent of the *Chemical News* adds an amendment from a German source, confirmed by his experience, to the effect that dilute sulphuric acid is much more effective, with less wear of the tool, than oil of turpentine. It is stated that at Berlin, glass castings for pump barrels etc., are drilled, planed and bored like iron ones, and in the same lathes and machines, by the aid of sulphuric acid.

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BUSINESS AND MANUFACTURING ITEMS.

SILK.—A large Boston silk-weaving concern is reported to be about to remove its machinery to Paterson, N. J.——One of the largest silk mills in Paterson, says the *Press*, has lately been taking a hundred or more hands, besides introducing additional machinery sufficient to set up a large mill, running on full time, and turning out large quantities of silk. *Per contra*, many of the other mills are nearly stopped.

LEATHER.—A tanner in New York is experimenting in tanning cat-fish skins, which it is thought will make good leather. The cat fish of the Western waters, it is said, sometimes weigh from one to two hundred pounds.——It is time that our rat skins were beginning to be utilized. At the present enormous price of gloves, our inventors and manufacturers ought to be equal to doing something with our undeniable plethora of raw material in the shape of rats. Rat catching for the glove makers is a great business in Paris and other European cities. Our rats want reconstructing, badly.

IRON.—The Newburyport Arms Company has commenced turning out rifles and pistols.——A new machinists' tool manufactory has been started at Providence.——The Badger Iron Works, New York City, have just completed two carriages for 20-inch guns, weighing 12 tuns each, for the Chilian Government. The guns are to be cast at Pittsburg.——After a suspension of three months, the rolling mills in Youngstown have resumed operations at the old wages.——The iron sand of New Zealand is to be smelted on a patented plan by a company formed for the purpose, and operations will be commenced without further delay.——The Cornwell Iron Works, near Cedar Bluff, Ala., have resumed the production of their superior quality of iron, which will be shipped to New York in pig.——A new railroad rolling stock manufacturing company has been incorporated in Dayton, Ohio.

COTTON, ETC.—The Renfrew (South Adams) Manufacturing Company are putting up a mill, 150 feet long by 66 wide, with two wings, each 40 feet by 56, and will run 260 looms.——The cotton mills of Columbus, Ga., burned during the war, are mostly rebuilding and will resume operations in the course of the present year.——The Falls City Manufacturing Company, Louiiville, Ky., propose to increase their capital by $50,000 and eventually to $1,000,000, and to take another large factory for their linen works, and to manufacture flax machinery for their mills.

RAILROADS, ETC.—The gross earnings of the Erie Railway for 1866 were over fourteen and a half millions ($14,596,413 09) against nearly sixteen and a half millions ($16,462,227 90) in 1865. Net earnings, $3,743,273 05; net decrease from 1865 $964,559 52. The falling off is attributed to the stoppage of the Government war business and the general stagnation following the war. The company operate 784 miles of road, have 371 locomotives and 6,000 cars, a capital stock of $25,111,210, a funded debt of $22,429,920, and property amounting at cost to $54,287,874 49. A dividend has been declared of 4 per cent on common and 7 per cent on preferred stock.——The Hudson River Railroad Company have recently created new stock equal to the whole amount of the old ($7,000,000) making their capital now $14,000,000 in addition to $5,550,000 funded debt. Fifty per cent on each share of new stock is allowed to the old stockholders as accumulated profits (including April dividend) and the other half, raised in cash, is to be applied to the improvement of the station property in St. John's Park and of the whole line from New York to Albany.——The Oregon Central Railroad is intended to connect the steamship landing on the Columbia River with the head of the Willamette Valley, 150 miles. It has a land grant of 12,800 acres per mile and a State subsidy of $10,000 per mile in gold-bearing bonds, for the first 100 miles. The work is to be commenced at once and finished in three years.——The new Suspension Bridge at Niagara is to be located on the American side near the gas works; on the Canada side a short distance below the Clifton House. The stockholders organized on the 2d ult. The preparation of materials has been commenced, and the bridge is to be erected in the course of the summer.——The first 305 miles of the Union Pacific Railroad were graded, bridged and ironed with a heavy T-rail and supplied with depots, repair shops, stations, locomotives, cars and all the necessary appurtenances of a first-class road for $50,000 per mile.——The St. Paul and Chicago Railroad (capital, $6,000,000, to be completed in two years) is to connect St. Paul with the Chicago and Milwaukee roads at Winona, 101 miles, and run thence 50 miles to the Iowa State line. It has a land grant of 904,960 acres, nearly an air line from Chicago to St. Paul, and very light grades. Beyond St. Paul, the St. Paul and Pacific line runs nearly straight to the Hudson's Bay Company's territory, and is already in operation 76 miles.——The Persian telegraph is to be completed from Teheran to the Turkish frontier, by the end of June.——After ten years' warfare, the Great Western and Grand Trunk Railways of Canada have come to an agreement on rates and fares.

WOOLEN.—There are five hundred woolen factories in the State of Indiana, some of them having over three hundred thousand dollars invested.——The stockholders of the Amesbury (Mass) Woolen Mill Company have decided to sell at auction the entire corporate property which cost about $140,000. The company is heavily in debt.

MISCELLANEOUS.—The Chicago *Journal* says that one of the leading architects estimates at least three million dollars' worth of contemplated new buildings entirely abandoned or indefinitely postponed on account of the eight-hour movement.——The tobacco manufacture of New York City and the suburbs is an enormous business, said to exceed that done in any other staple, and to be second only to cotton as an export, selling $100,000,000 annually, employing 25,000 persons, and conducted by 1,613 firms.——A new paper mill is to be built at Elmira this summer, and a new tannery.——High street, Columbus, is to be paved with the Nicolson pavement, at a cost of $80,000.——The Western farmers are sowing flaxseed very extensively the present season.——The Board of Engineer Officers detailed under the Act of Congress to form a plan of improvement of the Hudson below Albany, have decided to proceed with the plan formerly adopted and partially carried out.——The city of Chicago is deepening the Michigan and Illinois Canal by an excavation through solid limestone ten feet deep and eight miles long, so that boats can float out of Chicago River into the canal without a lock, and a current will be formed in the Chicago River to the great improvement of that stream. The work will be completed in about two years. The Washington street tunnel is also going forward.——Free water power and freedom from taxation for five years, has been voted to new manufacturers on the Molunkus River, near Sherman Mills, Aroostook county, Me.——Dam and mills are going forward in Andover, Me., on Black Brook; also a starch factory on Gardiner's Brook.——The various Holyoke (Mass.) Mills unite in mitigating dull times for their employees by economy in board; the prices established in the corporations being $3 50 for males, and 2 50 for females.——On the dissolution of the large furniture manufacturing firm of Mitchell & Rummelsburg, Cincinnati, by the death of Mr. R., the surviving partner recently threw the establishment into a co-operative stock concern, with a capital of $2,000,000 in $100 shares, a considerable part of which was taken by the workmen.—The salt manufacture has been resumed at the old mills near Emporium, N. Y., with the advautage of the Buffalo and Washington Railroad.——Harmony Mills, Cohoes, N. Y., have in one building two unobstructed rooms measuring 70 by 625 feet and 612,500 cubic feet, and five in another building, 72 by 560.——A paper mill is going up in Butler county, Ohio; cost $100,000.——Little Rhode Island employs $33,000,000 of manufacturing capital and produces $103,000,000 worth of goods in a year. Considering the state as one complex Yankee machine, the attentive spectator will perceive issuing from its different mouths every second in working hours nearly ten yards of cotton cloth, nine yards of calico, one yard of woolen cloth, one dozen of shoe and corset lacings, one yard of worsted braid, and a spool of thread; a horseshoe and a gross of screws every four seconds, beside other matters too numerous to mention.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Recoil of Guns.

MESSRS. EDITORS:—In the article on "The New Steam Gun Carriage," page 350, the following part appears not entirely correct, viz:—"A ball moving at 1,000 feet per second of initial velocity, weighing 450 pounds, exerts a force equal to 450,000 foot-pounds. If the gun and carriage weigh 50,000 pounds, they will have an initial velocity of 9 feet per second and a force of 450,000 pounds, which must be absorbed before they are completely brought to rest."

The energy of the ball is correctly calculated at page 302,

$$=\frac{450}{2\times 32{\cdot}15}\times 1{,}000^2=6{,}998{,}444 \text{ foot-pounds.}$$

Energy of gun and caarriage

$$=\frac{50{,}000}{2\times 32{\cdot}15}\times 9^2= \quad 62{,}967 \text{ foot-pounds.}$$

Total energy exerted by powder=7,061,411 foot-pounds.

Assuming the charge at 40 pounds, the effect above overcoming resistance of atmosphere is 170,000 foot-pounds per pound of powder, which agrees with table page 302.

Taking the distance traveled through by the ball till leaving the muzzle at 12 feet, the total average pressure is 7,091,411÷12=590,951 lbs. on an area of 176 square inches, or 3,357 lbs. per square inch above atmospheric pressure.

Owing to the high degree of expansion, the initial pressure in the gun must be perhaps ten times as large or more, say 35,000 pounds per square inch. The area of the 11-inch cylinder taking up the recoil is 95 square inches. If the piston moves one foot before stopping, the average pressure will be 62,697÷95=662 pounds per square inch: at four feet motion, 165 pounds. Further calculations without more complete data, and disregarding friction, are of no value.

The difference between the energy transmitted to the ball and that imparted to the gun and carriage is by no means in in opposition to the laws of Newton, as some of your correspodents appear to think.

The expression, "a force equal to 450,000 foot-pounds," is objectionable. It appears to be settled among engineers that whatever is expressed in foot-pounds is called "work" or "energy," while a "force" is given in pounds or other unit of weight.

A. FABER DU FAUR.

Washington, May, 1867,
Third Div. Q. M. General's Office.

Electricity in Iron Smelting.

Of all the remarkable applications of electro-magnetism which have been made within the past three or four years says the *Athenæum*, the most remarkable is perhaps the one now talked about, namely, the use of an electro-magnetic current in the smelting of iron. We hear that the experiment has been tried at one of the leading ironworks in Sheffield, and with complete success. The mode of operation as roughly described, is to place a fixed electro-magnet opposite an opening in the side of a furnace, to excite the magnet by means of a Smee's battery, and to direct the current of magnetism into the molten metal. The effect is surprising; the metal appears to bubble and boil, the melting is expedited, which economises fuel, and the quality of the iron is so much improved that for toughness and hardness it can hardly be equalled. It appears that some, if not all the impurities which remain after the ordinary process are driven out by the use of magnetism; consequently, this new application of the occult element may be regarded as full of promise, for all who work in iron. All of which is to be taken with a grain of salt.

Vitrified Photography.

De Mothay and Marechal have produced a new method for fixing vitrified photographic images in porcelain enamel, glass, etc. The article is first varnished with a solution of 4 parts of caoutchouc in 100 of benzol, with the addition of one part normal collodion. After drying, a second coating of iodized collodion is poured over the first, and unites intimately with it. It is then immersed in a bath of nitrate of silver, and the image is produced either by camera or superposition, developed by any of the usual agents, and fixed by two successive baths, one containing a solution of an iodocyanide, and the other an alkaline cyanide. It is next steeped for some instants in a solution of protoxide of iron, pyrogallic acid, or any other substance that will reduce the salts of silver. The image is intensified by the action of pyrogallic, gallic or formic acid, or sulphate of protoxide of iron mixed with an acid solution of nitrate of silver: requiring four to six applications for images to be seen by reflection, and twelve to fifteen for those to be seen by transparency. During this operation the image is washed three or four times in alternate baths containing iodocyanides and alkaline cyanides, and then, immediately afterward, in sulphate of protoxide of iron, pyrogallic acid, or other reducer of salts of silver. The consecutive baths are to dissolve the non-adherent silver precipitated over the whole plate in each reinforcing bath, while intensifying the fixed image. The washings in the reducing bath, rendering the metallic surface neutral, increase powerfully the subsequent action of the re-inforcing bath. The image is now immersed for several hours in a bath of chloride or nitrate of platinum, or in alternate baths of chloride of gold and nitrate of platinum, or again in a bath of chloride of gold, according to the color desired. During this steeping, the silver of the image is partly replaced by platinum or gold or a mixture of both. The platinum bath gives eventually by vitrification a greenish black, the alternation of platinum and gold yields black, and the gold alone results in gilt images. Next the image is washed in a solution of alkaline cyanide, or a concentrated solution of ammonia; then covered with a thick varnish of caoutchouc or gutta percha, and heated in a muffle, when the organic matters are consumed and the metal left. Finally, the image is covered with a silicic or boracic glaze, and brought to an orange red heat by which it is vitrified, and unchangeably fixed.

Illustrated Patent Office Report for 1865.

We are indebted to Messrs. E. R. Jewett & Co., publishers, Buffalo, N. Y., for a bound volume, Part II., Illustrated Mechanical Report for the last part of the year 1865.

The engravings are well executed, the inventions clearly defined and the entire work a marvel of neatness. These Reports which Messrs. Jewett & Co. have published for a number of years are in great contrast in point of execution to most of the public documents issued under the direction of Congress.

We hope the Commissioner of Patents will exert all of his influence to award the continuance of the publication to Messrs. Jewett & Co., who have done the work so acceptably.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

BOQUET STAND AND HANDKERCHIEF HOLDER.—A. D. Frye, New York City.—This invention relates to a new and ingenious arrangement whereby the beauty and value of a boquet of natural flowers is greatly increased by its combination with the beautiful designs of art. The boquet is formed on a higbly ornamental tubular holder which may either be held in the hand or be made to stand of itself; the lady at the same time is relieved of the trouble of holding her handkerchief while the handkerchief itself is receiving the perfume of natural flowers.

CAR COUPLING.—John D. Anderson, Corry, Pa.—This invention relates to a new and improved method of coupling railroad cars.

ROTARY STEAM ENGINE.—J. H. Van Sandt and J. J. Hunt, Princeton, Ind.—This invention relates to the manner in which an uninterrupted action of the steam upon the shaft of a steam engine is obtained whereby the objections to a crank and the difficulty experienced from dead center is overcome.

METHOD OF CONVERTING AND MULTIPLYING MOTION.—H. Burk, Mineral Point, Ohio.—This invention consists in forming an eccentric or zig-zag channel in the sides of a wheel that is attached to and revolved by a rotating shaft, and in constructing a pitman so that it shall receive a rectilinear motion from the wheel by having its end fitted to the irregular groove before mentioned.

SAWING MACHINE.—Henry Hassenpflug, Huntington, Pa.—This invention relates to a portable sawing machine which is to be chiefly used for cross cutting, and for cutting cord wood, and for scroll work, but which may also be changed so as to be used for ripping. The invention consists chiefly in the self-feeding apparatus whereby the wood is gradually fed to the vertical reciprocating saw; also in such a construction of the parts that the distance between the ends and the fulcrum of the lever by which the saw is operated can be changed at will, so as to increase or diminish the power or the speed of the machine as may be desired.

GANG PLOW.—L.B. Lathrop, San Jose, Cal.—This invention relates to a new plow which is constructed with a view of reducing manual labor in plowing and to secure an ease of draft not heretofore attained.

BATH TUB.—John Carroll, New York City,—The object of this invention is to construct a bath tub of sheet metal and wood in such a manner that it will be durable, light, and easily packed for transportation.

PENCIL SHARPENER.—Hubert Burgess, San Francisco, Cal.—The nature of this invention consists in constructing a device by which slate and lead pencils, also crayons, may be sharpened in the most perfect and expeditious manner.

APPARATUS FOR REMOVING WATER AUTOMATICALLY FROM THE HOLDS OF VESSELS.—H. L. Stibbs, Savannah, Ga.—This invention has for its object to furnish an improved apparatus by means of which water may be removed from the holds of vessels automatically.

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MACHINE FOR STAMPING CLAY DOOR KNOBS, ETC.—George Lawton, Trenton, N. J.—The object of this invention is to construct a machine whereby door knobs and other articles of clay may be formed or stamped in the most simple and efficient manner, completing the door knob or other articles as far as the working in clay is concerned. The invention consists in such an arrangement of the machine that the stamping process may be perfect; the upper die falling down three times with variable force so as to completely finish the article. The machine is also so arranged as to prepare the holes in the knobs or other articles for the reception of the shanks of said knobs or other articles.

WAGON-BRAKE LOCK.—Thomas Urie, Springfield, Iowa.—This invention relates to an improvement in the construction of locks for operating the brake on a wagon wheel.

CORSET.—James P. Love, New York City.—This invention consists in laying each steel of a corset between two flaps which are left on the corset, and in then hooking the outer flap to the body of the corset so that the steel is firmly held in place. By simply unhooking the said flap the steel can be at once released from the corset.

BUTTER WORKER.—S. H. Wade, Montgomery Center, Vt.—This invention has for its object to furnish an improved machine for working butter, cheap, simple in construction, durable, and not liable to get out of order, and which will do its work quickly and thoroughly.

TANNING APPARATUS.—Abraham Steers, New York City.—This invention relates to an apparatus in which the hides or skins are distended upon a cloth within a wired frame of suitable metallic substance, whereon they are subjected to the action of reciprocating platens or faces of rammers, in such a manner that they are repeatedly compressed, the spent tanning liquor squeezed out, and fresh tanning liquor of the requisite strength admitted to their tissues, the process of tanning being thereby most materially accelerated with a great saving of time and labor.

HOISTING APPARATUS.—Joseph A. Dayton, New London, Conn.—This invention has for its object to furnish an improved machine for use in store houses and in other places for hoisting heavy weights with a comparatively small exertion of power, and which shall be simple in construction, strong, and not liable to get out of order.

ROTARY ENGINE.—Thomas Banta, Hoboken, N. J.—This invention has for its object to furnish an improved rotary engine so constructed and arranged as to utilize the expansion of the steam and avoid the difficulties arising from the back pressure caused by the condensation of the steam upon the interior surface of the cylinder, and its subsequent expansion into steam.

GATE.—Gideon S. Granger and William Northrop, Wayland, N. Y.—This invention has for its object to furnish an improved gate so constructed and arranged as to require no hinges, and which may be raised up so as to allow small stock, such as sheep and hogs to pass through, while it prevents the passage of cattle, horses, etc., and so as to prevent its being clogged by snow.

WINDOW SASH FASTENER AND LOCK.—Ezram Johnson, Joliet, Ill.—This invention has for its object to furnish an improved window sash fastener and lock so constructed and arranged that it will hold the sash at any desired elevation; and which when the sash is closed will hold it securely locked.

DRAFT EQUALIZER FOR HORSE POWER.—Archibald Stewart, Troy, Wis.—This invention has for its object to prevent breakages in the machinery of threshing and other machines driven by horse power, from the strain caused by the sudden starting or jerking of the horses.

CLUTCH.—Albert Heth and Gaylon Hall, Adam Center, N. Y.—This invention relates to a device, which is to be used for suspending hay forks from rafters, but which may also be used advantageously for other similar purposes. The invention consists in the use of a metal frame, from which a swivel hook is suspended, to which the fork or other article may be hung. Two pointed rods are secured to the top of the frame, one being attached to a sliding brace, that is operated by a screw; these points can be brought against the opposite sides of any rafter or beam, and thus the clutch is held on the rafter and supports the fork by the swivel hook.

SECURING THE TINES OF HAY FORKS OR RAKES.—J. P. W. Riley.—Montrose, Pa.—This invention relates to a new manner of securing the tines or prongs of hay or manure forks, rakes, potato hooks and other similar articles, to the handle. This consists in making the tines or prongs out of two pieces, and scarfing the same together, within a mortise or slot in the handle, and driving keys or wedges behind them, so that they will be securely fastened to the handle. Should one of the tines break it can be easily renewed without throwing all away.

HARROW.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a harrow of that class which relate and are commonly termed revolving harrows. The invention consists in a novel construction and arrangement of the parts composing the same whereby the harrows are allowed to rise and fall, to conform to the inequalities of surface over which they may pass, and also rendered capable when required, of being secured in a higher or lower fixed position, so that the teeth may penetrate more or less deeply into the earth.

SPINDLE.—Joseph Smith, Loth, Belgium.—The object of this invention is to regulate the tension of the thread as the same winds on the bobbins, spools or tubes in machines for spinning, doubling and spooling wool, cotton and other fibrous materials whereby a softer thread is obtained than on the spinning machines constructed in England under the name of cap frames.

APPARATUS FOR TEMPERING STEEL SPRINGS.—Ira N. Bevans, Litchfield, Conn.—This invention relates to an apparatus which steel springs are tempered by drawing them through a vessel containing melted lead. In ordinary apparatus of this kind, the spring on leaving this vessel, is wound on a drum which receives a positive revolving motion by gear wheels or belts, and as the spring winds on the drum, it is drawn through the melted lead. By this operation the operation of tempering the springs is not uniform, because the diameter of the drum increases and the spring is drawn through the lead quicker and quicker so that it becomes too soft at the beginning and remains too hard at the end of the operation.

STUMP EXTRACTOR.—Isaac Pardee, Vineland, N. J., and R. C. Parvin, Forest Grove, N. J.—This invention relates to a machine for extracting stumps, elevating stone, and lifting or raising other heavy bodies. It consists of two rack bars fitted in a socket provided with pawls, and placed loosely upon a suitable framing, the rack bars having a lever attached to their lower ends, and all so arranged that a very simple, economical, and efficient device for the purpose specified is obtained.

FAUCET.—Alexander Brinckmann, New York City.—This invention consists in applying a spring to the spigot of a faucet, and also in applying stops thereto, whereby the faucet, when opened to draw liquid from a cask or vessel, will be immediately closed to stop the flow when the hand is withdrawn from the handle of the spigot, and the faucet be allowed to close entirely to stop any flow of liquid, or, when the faucet is applied to water pipes, be allowed to remain a trifle open to admit of a small stream of water flowing to prevent the freezing thereof during the winter season.

CUTTING BOLTS AND RIVETS.—Walter Britton, Abingdon, Ill.—This invention relates to a device for cutting bolts and rivets, and consists in a peculiar construction of parts, whereby a very simple, portable, and efficient device is obtained for the purpose.

MACHINE FOR SPLITTING WOOD.—Leonard Tilton, Brooklyn, N. Y.—This invention relates to a machine for splitting wood for fire-kindling purposes, and it consists of two reciprocating V-shaped knives or cutters, and a swinging holder, arranged in certain relation with a hopper and operator, whereby wood may be split into small or thin square pieces very expeditiously, and with but a moderate expenditure of power.

SURFACING OR LEVELING RAILROAD TRACKS.—S. L. Porter, Rochelle, Ill.—This invention relates to a new and improved device for the purpose of surfacing or leveling the tracks of railroads.

RAILROAD CAR SEAT.—Jesse S. Wheat, South Wheeling, West Va.—This invention relates to an improvement in railroad car seats, and consists in certain devices for reversing and holding the back of a seat in different positions of elevation or inclination to adapt it for the support and comfort of the person occupying the seat, instead of being confined to one position, as reversible seats are of ordinary construction.

LOCOMOTIVE PILOT.—B. F. Partridge, Jr., Columbus, Ky.—This invention relates to an improvement in the construction of a pilot for a locomotive engine, and consists of a series of inclined rollers on the sides of a wedge-shaped frame, similar in its general form to the pilot usually attached to the front of locomotives for the purpose of clearing the way of obstructions on the railroad track.

WHEAT DRILL.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a drill for drilling in wheat and other grain. It consists in the use of a rotary shaft, provided with pins, in connection with a seed-distributing slide, all arranged to effect the desired end.

MANUFACTURE OF CHEESE.—Sylvester Greene, Rome, N. Y.—This improvement relates to the means employed for expressing the whey from the curd, whereby the rich or buttery portion of the curd is retained. It consists in placing in the box or vessel, in which the curd is produced as usual by the application of rennet, a perforated plate and a strainer, if necessary, the plate, and also the strainer, if one be used, resting upon the curd, and by their own gravity alone, or with additional weight if necessary, be made to exert a very gradual pressure on the curd, so that the whey will pass up through the perforated plate.

MACHINERY FOR CUTTING WOOD MOLDINGS.—George S. Hudson, Ellisburg, N. Y.—This invention relates to improvements in machinery for cutting waved and serpentine wood moldings.

PLOW.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a new and improved plow of that kind designed to be attached or applied to a frame mounted on wheels, and to consist of one or more plows. The invention consists in a novel construction and arrangement of parts whereby the plow is placed under the complete control of the operator or driver.

CUTTING SHEET LEAD.—S. E. Chubbuck, Roxbury, Mass.—This invention relates to a new means for cutting sheet lead transversely during the rolling or milling process, whereby said work may be done with the greatest facility.

SLEEPING-CAR BED FOR RAILROADS.—J. Wyatt Reid, New York City.—This invention relates to a novel method of constructing and arranging the beds in a railroad sleeping car, and consists in forming the beds of canvas or other suitable material, attached to rods or chains in such a manner that they may be conveniently suspended for sleeping in, and taken down and packed away as may be necessary.

ADJUSTABLE SHOE SOLE AND LIFT.—Charles B. Loveland, Elizabethport, N. J.—This invention relates to improvements in the manufacture of shoes, boots, etc., and consists in attaching an extra sole to a single sole by means of a metal plate fastened with screws, and also inserting a metal plate lift and tap secured to it in such a manner that the metal plate lift and tap on the heel of the shoe on the one foot may be shifted and adjusted to the shoe on the other foot in on order to equalize the wear on the sides.

HORSE HAY RAKE.—Israel L. Bullock, Mercy, Ind.—This invention relates to a revolving horse hay rake, and it consists in a novel arrangement and application of the rake whereby it may be actuated or controlled by the feet of the driver, and with the greatest facility.

DEVICE FOR TRANSMITTING MOTION.—Leonard Tilton, Brooklyn, N. Y.—This invention relates to a mechanical device for transmitting a reciprocating motion from a rotary shaft, and it consists in the employment or use of a belt shipper in connection with a cam, on idle and working pulleys, and gearing.

MACHINE FOR CUTTING SLATE.—J. W. Durgin, Bangor, Maine.—This invention relates to a machine for cutting slate for roofing purposes, and it consists of a knife attached to a suitable bed-piece, and of such a shape as to cut the slate in the form required, the knife being attached to the bed-piece by pivots, and operated through the medium of a lever or treadle.

CLOTHES-WASHING MACHINE.—Robert Rooke, Empire City, Oregon.—This invention consists in a series of pounders arranged in connection with a rotating perforated tub which is placed within a fixed or stationary tub, the pounders and rotating tub being operated from one and the same driving shaft, and all so arranged that the clothes may be cleansed very expeditiously and in a perfect manner.

CORN PLANTER.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a machine for planting corn and other seed in hills or drills, and it consists of a novel seed-distributing device and a covering mechanism to accomplish the desired end.

DEVICE FOR HOLDING CLAPBOARDS.—William H. Cummings and Isaiah Babcock, Boonsboro, Iowa.—The nature of this invention consists in a new and useful clamping device for gaging and holding weather-boards or siding when put on a building for the purpose of securing them on each other evenly and expeditiously.

BALE TIE.—Henry Lampson, London, England.—This invention consists in so arranging two metal loops or rings, which are similar in form to the "sliding loops" of leather used with leather straps, that by means of these loops or rings the ends of the metal bands are firmly held and clamped.

METHOD OF CHILLING OIL.—John E. Richardson, New York City.—This invention relates to a new manner of chilling all kinds of oils so that they may be kept in a fluid state after having undergone this process. It is adapted more particularly to the production of paraffine from petroleum or other hydro-carbon liquids, but may also be used with the same effect in the treatment of lard from animal oils.

VEHICLE.—John S. Campbell, Newton, N. Y.—This invention consists in making the body of a carriage or sleigh, and also the carriage wheels or sleigh runners of hard rubber in such a manner as to produce a durable and elegant carriage or sleigh with comparatively little trouble or expense.

THE MANUFACTURE OF SULPHURIC AND OTHER ACIDS.—John Hughes, Brooklyn, N. Y.—This invention relates to an apparatus for concentrating sulphuric acid to any desired degree; and which may also be used for any other kind of acid.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."

E. R., of Wis.—The earth has the form of an oblate spheroid, of which the equatorial diameter is about twenty six miles longer than the polar. The bulging out toward the equator is generally conceded to be due to the centrifugal force of the earth's revolution. The water in the equatorial ocean is about thirteen miles higher than in the polar ocean. The ocean current moving from the north pole southwardly is running up hill (up hill being defined away from the center of the earth) and if the current travels to the equator, it has run up thirteen miles. A river running south in the northern hemisphere has a tendency to wear on its western bank.

J. W. L., of N. Y.—The force given out by condensed air on expansion is precisely equal to the force which was used in the compression, provided that none of the heat of compression has been lost. The form of vessels used or the rate or manner of compression or expansion, do not affect the question one way or the other.

H. H. B., of Iowa.—Your proposed chimney 48 feet high by 30 inches diameter will surely give you draft enough to burn saw dust.

J. Mc. C., of Wis., is much annoyed by leakage of valves of his engine. The valves are brass and the seats iron. The leakage is caused by the unequal expansion of iron and brass. The valves should be replaced by iron valves. Brass valves are now generally discarded.

G. B. N., of Texas, asks how he can consume the smoke from his boiler furnace made by burning pine shavings. Construct behind your fire box a combustion chamber through which the smoke must pass and feed it with atmospheric air through apertures the sizes of which may be controlled by dampers.

H. H., of Wis.—We are not responsible for the published opinions of our correspondents, and in the case you quote we differ with the writer if he means what he says in the portion of the sentence you quote; that "a boiler will make steam faster when the pressure is high than when it is low, with the same fire." Probably his meaning is to be seen, in the remainder of the sentence; "so it is economical to carry a high pressure—even if it is not necessary to do the work—and to work the steam expansively." It has been pretty well established that it is economy to use high pressure steam, but we not think the same fire will generate more under a pressure of 100 lbs. than under one of 50 lbs.

L. J. O., of Minn., is troubled by the overflow or the creeping over of the oil in his lamps, and wants a remedy. The smearing of the upper part of the lamp with a substance which is repulsive to oil might be effectual. Try the white of an egg or gum arabic.

C. F. R. of Conn., sends us a sample of printing paper made from sedge or marine grass grown in Norwalk harbor. When cured the hay is sold for $3 per tun. The paper is manufactured by Henry Betts, Norwalk, Ct.

R. V. M., of Conn.—You cannot make the best quality of sealing wax, if you omit the shellac. Sealing wax without shellac is brittle.

D. L. M., of N. J.—Spirit varnishes have often been used as substitutes for ordinary blacking for shoes, and answer admirably for one or two applications. The objection to the continual use of the varnish is that its resinous matter fills up the pores of the leather rendering it stiff and rough.

R. S., of N. Y.—There is no standard recipe for making what is called Babbitt metal. The name simply indicates an alloy of certain properties or uses without reference to its exact composition. Antimony generally enters into the composition, but is not essential. Zinc is nearer in properties to the Babbitt metal than any other simple metal.

S. V. L., of Vt.—There are many exceptions to the law that alloys melt at a temperature below the mean melting points of its constituents. . . . . wrought iron may be melted, and cast into molds, but the operation is not practicable on account of the intense heat required. If we could easily produce the heat to melt wrought iron, what could we melt it in or keep it in?

R. G. G., of N. Y.—Telegraph wires are now every where made of iron. A perfect coating of the iron with copper would no doubt be useful, but more for the purpose of protecting the iron from rust than for increasing the conducting power.

S. B., of Ill.—A blow pipe produces a greater intensity of heat by reason of its furnishing the air for more combustion within a given space and time. Whether a given amount of air should issue into a furnace from two or more tweers, would depend mainly upon the size of the furnace and the work to be done. Where the object is to bring the whole body of fuel into equal and vigorous combustion the greater the division of blasts of air the better. Most blast furnaces may be improved by multiplying the number of tweers.

A. Y., of Vt.—We are not acquainted with a late work on "Natural Philosophy by Prof. Comstock" and therefore cannot give an opinion on the centrifugal pump to which you allude.

P. P. C. C., of Eng.—The specimen of dry lubricant which we have received appears to be a very useful article.

G. S. W., of Pa.—Sends a diagram representing a train of gearing. The first member of the train is a worm or screw acting on a wheel of a hundred teeth. One hundred turns of the worm revolves the wheel once. The axis of this wheel is a worm acting on a second wheel also of a hundred teeth. The axis of the second wheel is likewise a worm acting on a third wheel of a hundred teeth. Suppose the worm No. 1 revolves 100 times in a minute what is the rate of revolution of wheel No. 3?

W. W. & Co., of Texas.—If you think it would pay to manufacture ice in Texas at an expense of say 3 cents a pound for materials, the requisite information may probably be obtained by writing to M. Foselli, manufacture of *Glacier Roulante*, at the Great Exhibition, Paris.

W. B., of Ill., disputes with a friend concerning the philosophy of the siphon, and we are appointed umpire. "Does the siphon work on the same principle as the common suction pump?" Yes. In the pump the lifting of the piston or sucker produces or tends to produce a vacuum, and the pressure of the atmosphere forces the water up the barrel to prevent or fill the vacuum. In the siphon it is the greater weight of water in the long leg, which tends to produce the vacuum, and the pressure of the air which forces the water up the short leg to fill it. The force which raises the water in both cases is the same—the weight or pressure of the air. As the pressure of the air per square inch is only equal to the pressure of a column of air 34 feet high and 1 square inch in section, neither the pump nor the siphon can raise water higher than 34 feet.

F. R., of N. Y.—You ought to have no difficulty in using tinsmith's solder in soldering the connections of the zinc plates of your battery. Use with it the common soldering fluid, a solution of chloride of zinc.

G. W. V., of Miss.—To restore the softness and pliancy of leather which has become hard by having been wet, apply neat's foot oil and rub it in. The luster of morocco is restored by a varnishing with the white of an egg.

E. D. H., of——inquires whether the top of a wagon wheel moves faster than the bottom while attached to an axletree and running on a road. Certainly it does. On page 251, current volume, April 20, this question was answered in a reply to T. M. S. Jr., of Ga. You can prove it by placing a straight-edge upright at the side of a wheel across the center, and mark on the rim, where the straight edge touches top and bottom, and then draw the wagon forward far enough to turn the wheel slightly. You will find the mark at the top of the wheel has traveled much further from the straight edge, than that at the bottom.

D. A. McK., of Pa.—We think you can break up your casting by drilling a few holes of three-quarters or one inch diameter from six to ten inches deep, filling them nearly to the top with water and then inserting carefully fitted steel plugs to rest on the top of the water. A blow from a heavy drop will probably do the business. In your case the mass of iron is three feet square; perhaps inch holes, drilled ten inches deep, and filled to within two inches of the top would be effective. The steel plug should be about four inches long and fit as nearly water tight as possible.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Manufacturers of clock work to run light machinery send address to A. S. Griswold, Pittsburgh, Pa.

Makers of Brass Lamp Tops address A. Packham, Prestonsville, Carroll county, Ky,

Wanted—Manufacturers of Agricultural Implements of all kinds. See advertisement and address A. P. Smith, Sterling, Ill.

Wanted—The address of Mr. Snow, patentee of Match Safe, dated April 19, 1864. Address J. Maclaren, Scranton, Pa.

Manufacturers or dealers in machinery for the manufacture of tubs, buckets and firkins, please send their address to D. S. McDannel, Kachusa, Lee county, Ill.

Small Emery Balls Wanted.—Address Box 258, Troy, N. Y.

Jos. Lees, 417 East 10th street, New York City, alleges that he has valuable improvements in manufacturing gas from coal, and he wishes to engage with some company where his services may be apppreciated

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Improved Electrical Machine.

The apparatus represented in the engraving is a novel device for generating frictional or static electricity. It is of simple and cheap construction, and is far more powerful than the ordinary machine. It is without doubt the most important addition to the apparatus for generating and illustrating static electricity which has been made since Franklin's time.

In appearance it resembles the ordinary plate machine. In fact the most prominent part is a glass disk which is mounted and revolved in the usual manner. But the plate is thinner —the thinner the better—and as it is desirable to revolve it very rapidly, a multiplying wheel is connected with the plate so that one turn of the crank shall give four or more revolutions of the plate.

The machine has no rubbers; it produces torrents of frictional electricity, but the electricity is not generated by friction; there is no friction about the machine except at the axle bearings. The plate revolves in free air, and nothing should touch it. In the place of rubbers are what are called inductors, which are strips of paper three or four inches long and about one inch wide. They are supported and insulated on pieces of glass which (in the figure) are of spear-head form. The inductor is made complete by pasting on to the paper pointed pieces of card board which project beyond the glass spear heads an inch or two. The spear heads are attached to the framework of the machine so that they shall be parallel and as near as possible to the plate on its crank side. In the figure, four inductors are represented, each having two card points all turned in the same direction.

Opposite the inductors, at the front of the plate, are the comb points which serve to collect the electricity and convey it to the conductors for use. Each inductor is furnished with its set of points. The combs are attached to brass rods terminated at their other ends by brass balls. The rods are fastened to the framework of the machine and are insulated from it. The balls at the ends of the rods may be connected to each other in any desired order by means of bent wires.

The machine is put in action by slightly electrifying any one of the inductors by means of an excited rod of hard rubber, glass tube, or otherwise, and turning the crank. Its power progressively increases for about a minute, and until it reaches the maximum, when it furnishes a steady supply of electricity as long as the disk is revolved. The amount of electricity which a disk of only two feet in diameter will yield is almost incredible to one who has not witnessed it. It rushes between the terminal balls or poles when arranged as in the figure, as a perfect but steady torrent of purplish blue fire, or by a slightly different adjustment, in balls of dazzling lightning, each discharge being accompanied by a report like a torpedo.

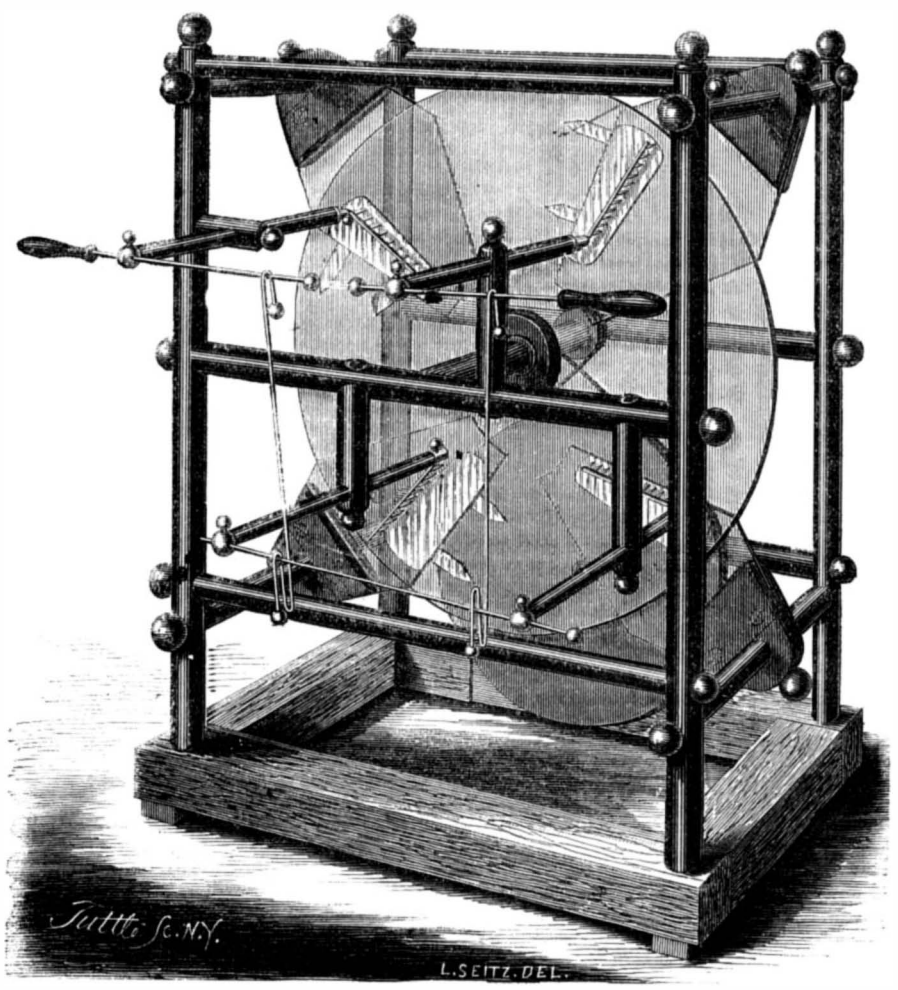
Now for the explanation of the action of the machine. There are three elements which are chiefly to be considered—the inductor, the plate, and the comb points. What are their relations towards each other? If a pointed wire be brought opposite an electrified body, as, for example, a prime conductor, we say that the electricity is discharged on the point, or that the electricity is attracted by the point. Or we may say the + electricity of the prime conductor attracts the — of the wire and repels its +, and a stream of — flows out of the wire at its point, while the + flows to the opposite direction. Now suppose a sheet of glass be interposed between the point and the conductor. The attraction of the + of the conductor for the — of the wire, is by no means lessened; the — is accumulated towards the point, and by reason of its higher tension flows out on to the glass. But the glass is impervious to the electricity, and it remains on its surface; the glass becomes electrified.

Now, in the Holtz machine we have the electrified body in the inductor, the wire point opposite, and the glass plate interpose. Suppose inductor No. 1 electrified +, this + attracts — out of the comb points on to the interposed plate. The plate moving on, the part electrified — comes opposite card points of inductor No. 2. Here — of the plate draws out of the card points + on to the glass, and inductor No. 2 becomes charged —, while the glass is — on the further side and + on the near side. Inductor No. 2 being charged — draws + out of comb points No. 2, and neutralizes the — drawn from comb points No. 1. Card points No. 3 discharge — on the plate, and inductor No. 3 becomes +, and like No. 1 draws — out of its corresponding comb point.

It will be seen that the alternate inductors are oppositely electrified, and that their corresponding comb points, give out or receive accordingly. By varying the manner of connecting the balls at the extremities of the comb points a considerable variety of changes in the relation of the quantity and intensity may be obtained. These variations are somewhat similar to those which are secured by varying the order of connecting the elements of the galvanic battery. The adjustment in the figure is that for greatest intensity. By connecting one of the poles with the ground the other may be used as a prime conductor for charging Leyden jars, etc. It is found advisable, in order to secure more perfect insulation, to varnish the plate and the inductors with shellac varnish.

In the original Holtz machine the inductors were arranged on a disk of glass in which holes or windows were cut to permit of the action of the card points. The new machine was invented in 1865, and it was briefly noticed in German publications in the fall of that year. The first complete description was published in Poggendorff's *Annalen*, in March, 1866 The inventor, W. Holtz, is a distinguished physicist, and resides in Berlin, Prussia.

The machine from which our drawing was made is an elegant specimen of workmanship and was constructed by Messrs. C. T. & J. N. Chester, of New York City. The base is wood and the framework hard rubber.



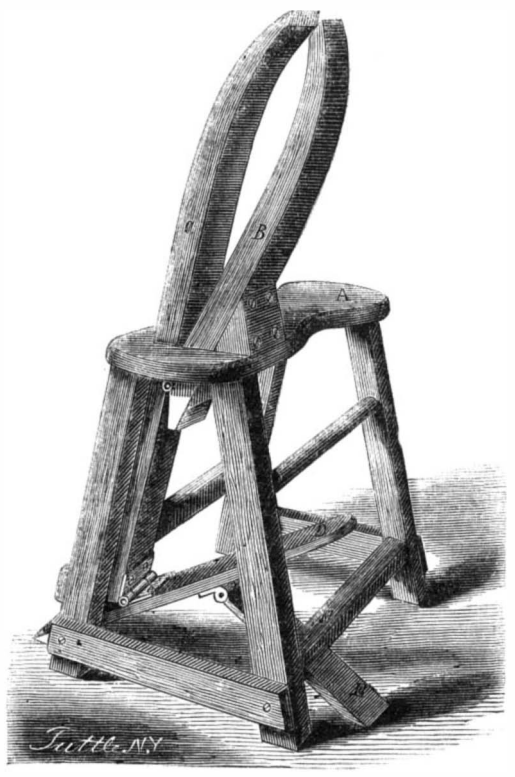
THE HOLTZ ELECTRICAL MACHINE.

What is the Matter.

Notwithstanding the great number of patents issued weekly the back work of the office is not being brought up as it should be. The Commissioner has authority to appoint a sufficient number of Examiners to do the work of the office, why does he not do it? Inventors who applied for patents several months ago ask the question. Who can answer it?

IMPROVED STITCHING CLAMP.

The object of this invention is to obviate the objections made to the ordinary sewing clamp, that the jaws are obstructed by springs and straps, so that articles requiring depth of space, as dash boards, boot legs, etc., cannot be conveniently held; that the strap is liable to be broken in endeavoring to close the jaws, and that it is injurious to the



foot and leg of the operator. By the improvement represented in the engraving, articles one foot or more in depth can be inserted in the clamp; no spring is used, the tension of which must be overcome every time the jaws are closed; it has no ratchet teeth to tear the clothing, and it is self-retaining in all positions.

The horse, A, is of the usual style, having one firmly fixed jaw, B, and one movable one, C, hinged to B, just under the seat. The lower end of C, is hinged to the treadle or lever, D, both ends of which project beyond the sides of the frame of the horse. To the under side of D, about in the center of the frame, the auxiliary lever, E, is hinged, and it is secured to the rocking bar, F, which turns on pivots in two of the legs, or it may be hinged to a permanent bar or brace. This arrangement of the treadles forms a powerful toggle joint.

It will be seen that a slight pressure of either foot on the projecting portion of E, or the projecting end of D, on the opposite side of the horse, will open the jaws, while pressure on the other end of D will close them. The lever, E, may be made adjustable, to fit thicknesses of work which vary greatly, by having it slide through the mortise in the bar, F, and securing it by a pin passing through the bar and lever. By a slight alteration in the position of the levers they may be attached to a foot block, supporting upright clamps for closing shoes, used by women and children sitting on a stool or chair. This machine is so simple that it may be made by any one capable of handling wood tools, as there is no iron work about it but three or four common butt hinges. For stitching buckle straps and other articles requiring frequent removal, this clamp is well adapted, as the jaws can be worked very rapidly.

Patented through the Scientific American Patent Agency Oct. 23, 1866, by William W Taylor, whom address for rights, etc., 274 Broad street, Newark, N. J.

The Cholera.

From a recent report by Dr. Harris of the New York Board of Health we learn that about four weeks ago cholera reappeared in London and in Paris, but it is reported not to have spread to any extent. In the town of Elberfield, near the Rhine, and about eighty miles southeast ward from Rotterdam, the epidemic appeared and has spread to some extent. That town is in a region that sends many emigrants to New York by way of Rotterdam and Liverpool.

These facts can be understood by our people without awakening anxiety or fear, for "to be forewarned is to be forearmed," and although there may be numerous cases of cholera imported from the South and elsewhere, and though there may be repeated outbreaks in the lower regions of the Mississippi, the means of sanitary protection are definite, ample, and easily applied. But wherever, in places that are ready for the kindling of the epidemic, the true means of sanitary protection are not applied, the pestilence may yet make deadly ravages. The watchword of the Metropolitan Board of Health, "timely, active and preventive measures," should be adopted by every city and town to which the epidemic can come.

Scientific chemists and experimenters, and all well-informed sanitary officers now agree that saturated solutions of copperas and carbolic acid are at once the best and cheapest disinfectants that can be used against cholera.

Preparing Oxygen.

We may call the attention of our readers to a process for preparing oxygen which is very simple and inexpensive. It was proposed some time ago, by Mr. Mallet, to take advantage of the well-known fact that subchloride of copper, when exposed to the air, absorbs a large quantity of oxygen, producing an oxychloride of the metal. The latter when gently heated, readily parts with the oxygen which it has absorbed, and returns to its original condition. Thus, by alternate exposure to the air and heating, it can be made to play the part of an effective separator of oxygen from the atmosphere. We will now give a few details of the new process.

PREPARATION OF SUBCHLORIDE OF COPPER.—This salt is prepared with moderate facility by digesting four parts of finely-divided metallic copper and five of the common black oxide of the metal in hydrochloric acid. Prolonged digestion is required in order to effect this object, to gether with the presence of a sufficient excess of acid. The whole is evaporated to dryness as quickly as possible, and the dry residue preserved for use.

PREPARATION OF OXYGEN.—The subchloride of copper, prepared as above, is very finely powdered and intimately mixed with half its weight or rather more, of fine white sand. A little water is then added, and the mixture well agitated in a large vessel. After a few hours it will have absorbed all the oxygen from the air which it is capable of doing: and, when required for use, the mixture should be placed in a suitable gas-generating vessel, and gentle heat applied. Oxygen is then steadily given off in considerable quantity, and may be collected in the usual way.

The residue in the retort, when moistened with water and exposed to the air as before, absorbs a fresh quantity of the gas, which may be obtained again by heating, and this succession continued for a considerable time.—*British Journal of Photography.*

A TOBACCO POUCH WANTED.—A correspondent from Maryland, evidently an admirer of the "filthy weed," wants inventors to conjure up a better tobacco pouch than is to be found in the market. He says it should be neat and handy, having a mouth of metal, and should be so constructed as to fill a pipe without spilling the tobacco.

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STREET PAVEMENTS.

Columbus, Ohio, Jefferson, La., and New Orleans, as well as the common council of the city of New York, have joined in the rush for the Nicolson pavement. In the former city we are told that High street is to be Nicolsonized at an expense of $80,000. The city of Jefferson advertises a contract to pave one of its streets on this system, with another for wooden curbs to the sidewalks. In New Orleans and Chicago —two of the worst places in general for the endurance of wood on the ground—this pavement is commonly reputed to give entire satisfaction, and it is from experience in New Orleans that the action taken in the city of Jefferson has resulted.

The charms of the Nicolson pavement are almost overpowering to the judgment. Exemption from the deafening din which multiplies the labor of business between man and man, from the incessant jar which impairs the nervous system, from more than half the present cost of hauling goods and deterioration of horses and vehicles, and from the putrid accumulations in pavement crevices which turn to dust under the heat of the sun and destroy goods and clothing enough (to say nothing of health) to pay the whole cost of maintaining and daily sweeping a smooth pavement of the right sort: these are considerations which seem to decide men in favor of the economy of the Nicolson pavement, on less testimony from practice than they are willing in most cases to be satisfied with.

True, the reported testimony of experience in western cities, where this pavement has been longest tried, is, as we have before said, very strong. But there is another side to the question. We have before us a letter from a correspondent in Detroit, who presents it in this shape:—"I have examined the Nicolson pavement in Chicago, and have seen whole streets of it, that have been down five or six years at most, and are now completely used up by travel and rot." If this be true—and there are enough of our readers who know the facts which would verify or refute the statement—the mischief to public health from such vast masses of decaying vegetable matter could not be compensated by any advantage whatever.

It is possible that on well-drained sandy foundations, a wood pavement thoroughly packed in bituminous concrete may defy moisture and decay. But on the whole, the nature of wood and street soil together seem to be against the probability, and to indicate that in this respect at least, the Nicolson pavement is not perfect. It appears to us that the desideratum is to kyanize the wood by some process at once cheap enough to be practicable and efficient enough to insure it against decay. No doubt the owners of the Nicolson patent are alive to this necessity, but they may naturally be unwilling to burden their proposition with an additional cost that would probably defeat it altogether.

The problem is an interesting one to inventors. But let not their pains and ingenuity be thrown away in the dark. Few subjects, they should understand, have been so much studied and with so little success, as the paving of streets. No subject requires more practical knowledge and specific experience. It is of no use for people who know nothing of the paving business, however ingenious, to present their theoretical plans. We have before us a confident opinion that a perfect street would be made by plating the surface with iron. No wonder this correspondent complains that his suggestions are neglected. Iron pavement, far more ingeniously devised, was tried in this city years ago at great expense, with high hope and with ignominious failure. Iron sidewalks have also been tried by individual lot owners, and now exist as a nuisance to pedestrians, traversed even for a few feet with toil and peril. Stone has been tried in every shape, in every position and on every basis, and the deep, narrow-faced Belgian block, on a sand bed, remains the only thing tolerable in that line. All remember the renown of the great "Russ pavement" which was for some years the pride of Broadway, but after full experience has been cast to the moles and the bats as one of the worst pavements ever invented. One general law has been settled by all this costly and vexatious experience: *i. e.*, that it is impossible to know that a pavement is good for anything until it has been tried at least ten years on a New York city thoroughfare. This protracted test, the experience of Russ teaches that inventors of pavement must expect to abide, unless their contrivances are lucky enough to fail, as they mostly do, in a shorter period.

A MECHANICAL PARADOX.

Experiments have been going on for months in England, to determine the power of screw bolts to resist a sudden longitudinal strain. In repeated trials of projectiles against targets representing the armor plating of ships, it was found that the bolts which fastened the inner skin and outer plate, broke short off at a point just inside of the seat of the threads in the plate. Major Palliser conceived the idea of turning off the threads on the bolts between the points on the ends which engaged with the plates, thus reducing the diameter of the bolts. The result was almost incredible. It was found that a bolt with a thread cut its whole length became much stronger, or had practically more tensile strength, when the thread between the head and the engaging points was turned off, than when it was left on the bolt. Not only so: a smooth ⅝-inch bolt suspended by one end and subjected to the fall of a sliding weight striking the nut at its lower extremity, broke at the second blow, while a similar bolt turned down to ¼ of an inch except the screw end, bore ten blows and stretched ⅝ inch in 2¼ inches, before breaking.

The philosophy of this curious result becomes a very interesting question. The unqualified proposition that a bar of iron is stronger after losing a portion of its material, than before, is incredible, but when a portion of that material is nicked or cut, the conditions are materially changed. It is well known to mechanics that if a slight nick be cut around a bar of iron or steel it can be broken at that point by comparatively little force. This is seen every day in the smith's shop in cutting up iron. Take a bar of one and a half inches diameter and cut a slight nick around it, and it may be broken by a few well directed blows of a sledge. But if a bar much lessin diameter be attempted to be broken without first nicking it, the trial will be futile. We have seen precisely the same difference exhibited in drawing bars apart by their ends.

A very little of a substance has very little strength or power of resistance, whether contained in a large mass of the same or taken by itself. Now the force applied to break a clean bar of iron distributes itself through a considerable mass which opposes a considerable resistance. But let this force be concentrated upon a hair's breadth and that will give way as any separate hair's breadth of iron would. The formation of the nick in the surface is the means for this concentration. The forces of the blow passing through the mass, from each side, arrive at the nick, at the bottom of which they meet and unite upon an almost infinitesimal point, and the finer the point or the sharper the cut the less the surface to offer resistance. Now in the case of the screw, the threads are nearly concentric nicks, which offer fine points for concentrating the force of a blow, being the starting of a fracture. Let these nicks be turned out, so as to present a smooth surface, and the force which would have been concentrated at one point, is generally distributed over a comparatively large surface, and the reduced diameter, smooth, actually presents more resistance than the larger diameter nicked.

There are some useful lessons to be learned from these facts. One is that a sharp V thread, weakens a bolt much more than one which has a flat bottom, as the point of the thread presents so much smaller a surface for resistance than the blunt or broad bottom. Another suggestion is that the strongest bolt of a given diameter in the screw, is that in which the body under the thread is a very little larger than the shank. Again, a bolt should not be threaded further than is required for the seat of the thread; any further threading is an invitation to a fracture.

TIN LINED WATER PIPE.

In our last issue we mentioned a trial of this new manufacture which took place before a number of mechanics and scientific men, at the works of the company, foot of West Twenty-seventh street, this city. The results of the trial were entirely satisfactory to all who were present.

The pipe differs from the ordinary lead pipe in being, for its caliber, only about half the thickness of lead, and in being lined throughout with pure block tin, not merely washed or plated with it, but being really a pipe of tin enclosed by one of lead, the two being fused or welded together forming one solid whole. The object of the invention is to furnish a conduit for water free from the sanitary objections to which lead is subject, and also to furnish as cheap a pipe as one of lead That this object has been secured is the opinion of our most eminent chemists, physicians, and others competent to judge.

It is not to be denied that even the purest water standing in or passing through lead dissolves more or less of the metal, the oxide of which is a rank poison. This poison affects different persons in a different manner, some withstanding its influences for a long period while others sooner succumb. Such diseases as neuralgia and rheumatism are more prevalent among those living in towns and cities where the water is brought in lead pipes from a common reservoir, than among those who draw water for household purposes with "the old oaken bucket" directly from a well, and these and kindred diseases have increased since the introduction of water by these means.

While lead can be dissolved by the salts held in solution in all water used for domestic purposes, tin is not subject to these chemical changes. Practically it is as free from these influences as porcelain or glass. The additional cost, however, of tin over lead pipe, and the difficulties attending its application, have prevented its superseding lead pipe. This latter difficulty appears to have been overcome by the ingenious applications of Messrs. Colwells, Shaw & Willard in the manufacture of a combined tin and lead pipe.

The pipe is actually stronger than the lead pipe, as was shown by repeated tests on the occasion referred to, although weighing only about half as much per foot. Plumbers have successfully made excellent wiped joints on it with their ordinary solder, although the melting point of tin is much below that of lead; but success in making perfect joints without disturbing the inner tin pipe is assured by the use of a solder peculiarly adapted to it, which is furnished by the manufacturers of the pipe. The method of manufacture is easily understood. A powerful hydraulic press, worked by a steam engine, stands by the side of a furnace over which is a tank containing the melted lead. Directly under the press is a receiver, at the bottom of which a steel die is placed, the aperture in which corresponds with the external diameter of the pipe. The projecting portion of the press piston fits the receiver, and has a mandrel on its lower end corresponding with the inner diameter of the pipe to be formed. A cone shaped block of pure tin having a hole longitudinally through its center into which the mandrel fits, is placed in the center of the receiver directly over the die, the apex of the cone downward. The piston of the press is then lowered until the mandrel engages with the hole in the tin, when melted lead is let in and the receiver is filled to the top of the tin cone. After a few minutes to give time for the melted lead to form a junction with the outside of the tin the pressure is applied and the tin lined pipe comes continuously through the die and is coiled on a reel.

The invention promises much for the welfare of the community at large.

Lock Nuts.

The criticism of our foreign correspondent, "Slade," on the prevalent English mode of arranging the lock nut, in the machines exhibited at Paris, has given rise to a discussion in the English papers. An engineer writes in opposition to placing the thick nut on the outside as a lock nut, maintaining that the inside nut is the one to bear the strain, and must therefore have the strength; while the office of the outside nut is merely to check by its pressure or friction, the disposition of the main nut to work back under the effect of vibration.

The Editor of *Engineering* replies to this view, sustaining Mr. Slade, and explaining that an additional nut is a lock nut only when used against an elastic pressure or a varying strain, and when screwed up so tight as to take the strain off the intermediate nut, and force its thread against the thread of the bolt in an opposite direction to the strain. The pressure of the two nuts against the bolt thread in opposite directions and against each other constitutes the "lock," and the outside nut takes the whole strain until it has yielded sufficiently to bring the inside nut to bear outwardly upon the bolt, when the strain is brought equally upon both. It is therefore evident that the outer nut should be the stronger.

Ericsson's Manual Power Gunboat.

Captain Ericsson has performed many services for his native country, Sweden, for which the legislature has voted him an address of thanks. Among the latest and perhaps the most singular of these services is his plan of a fleet of light draft gunboats for the innumerable and devious channels along the island-girt coast and among the network of lakes peculiar to that country. One of these boats, iron-clad, is already constructed at Motata. The deck is completely below the water level, and is strongly protected with plating. A sort of oval tube or sheath, open at one end, rises above the deck higher than the water. From this points a 15-inch gun, which does not train, but moves according to the position given to the boat by a rudder so constructed as to turn the bow in the wished-for direction. The motive power is applied by the arms of thirty-two men, who act by a simple mechanism on a screw with four flanges. The power thus obtained is said to be thirty to forty per cent greater than when applied to oars. The advantages of this gunboat are cheapness of construction and maintenance (for of course no fuel is required) and exemption from disordered or injured mechanism. The cost is a little over $20,000.

Information Wanted.

Will the Commissioner of Patents have the goodness to inform us the present condition of the class under which surgical instruments, weighing scales, and dentistry are examined? How many cases have been acted upon by the present Chief Examiner in this department since his appointment several months ago? Applicants for patents in this class await an answer.

STRAWBERY AND GRAPE EXHIBITION.—The managers of the American Institute announce their annual strawberry and grape exhibition to be held at their rooms in the Cooper Institute on the 18th and 19th inst. The special premiums offered for the best collections of named varieties, eight in number, amount in the aggregate to two hundred and twenty-eight dollars. The Board of Managers offer prizes of three dollars each for the best quart of eighteen standard varieties. Fruit from a distance may be addressed, prepaid, to the care of John W. Chambers, Secty. No. 22 Cooper Building.

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PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
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On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
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In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

65,037.—Machine for Hulling Rice.—William G. Adams, Franklin, Mass.

I claim the combination of a narrow-outletted hopper, an elastic yielding feed roll, with its corresponding concave, and elastic yielding conveying surface, a rough surfaced cylinder, and a surface opposed to the yielding conveying surface, and extending between the feed roll and the rough surfaced roll nearly tangential thereunto when said parts or their equivalents, are arranged so as to operate substantially as described.

65,038.—Apparatus for Securing Pulverized and other Materials to Paper.—William Adamson, Philadelphia, Pa.

I claim the two endless aprons, E and F, in combination with rollers so arranged that the said aprons will converge towards pressure rollers, D and D', as and for the purpose described.

65,039.—Wagon Body.—J. H. Aldrich, Nashua, N. H.

I claim the arrangement and combination of said sill, A, with cap, B, for the purpose herein described.

65,040.—Tank for Storage of Petroleum.—Peter Andrew, Cincinnati, Ohio.

First, I claim the oil tank, so constructed that the oil will rest on the surface of the water and be surrounded by water on its sides, as set forth, when said tank is arranged and combined for discharging into the lower reservoir in case of a fire, substantially as set forth.

Second, I claim, for the purpose of extinguishing fire and saving oil that may be on fire, oil tanks situated in relation to each other, as described, connected by pipes constructed and arranged in such a manner that the oil from the upper tanks may be conveyed to the lower ones, without danger of fire being communicated through these pipes from the upper to the lower tanks, should the oil be on fire at the time of its being transferred.

Third, I claim the construction and arrangement of oil tanks and pipes connecting these tanks, as described and specified, for purposes set forth.

65,041.—Match Safe.—Charles A. Babcock (assignor to himself, D. M. Golden, and D. M. Kenyon), Frankfort, N. Y.

I claim the match-delivering drawer, d, in combination with the spring igniter, h, and finger, i, for elevating the lighted end of the match, substantially as set forth.

I also claim forming a receptacle, l, for the burnt matches upon the removable cover, k, to the hopper, a, so that said burnt pieces may be removed with facility from the match safe, as set forth.

65,042.—Steam Generator.—G. H. Babcock and S. Welcox, Jr., of Providence, R. I.

First, We claim a steam generator made up of sections of pipes, each of the several sections being composed of a series of inclined pipes, B, and a series of horizontal pipes, C, united at the ends by distinct side pipes appropriate to each section, the several sections, when arranged side by side and connected, forming an intermediate combustion chamber, A, and operating to cause a constant circulation of the water through the pipes in one direction, substantially as described.

Second, In combination with the series of horizontal pipes, C, the series of upright connecting pipes, D, for the purpose of allowing the steam, as formed, to separate from the water and rise to the discharge aperture, arranged substantially as described.

65,043.—Tempering Umbrella Ribs.—Thomas W. Ball, Morrisania, N. Y.

I claim, First, A tubular opening into which the ribs are introcuced, in combination with gas jets, or other source of heat, so applied as to act upon all sides of such tubes or tubular openings, and temper the umbrella ribs with uniformity, as specified.

Second, A double casing of non-conducting material, in combination with such tubular openings, and heat applied, in the manner and for the purposes specified.

65,044.—Method of Treating Affections of the Skin.—Augustus Barnes, Southington, Ct.

I claim the use or employment of a glass lens for removing flesh marks and discolorations, substantially in the manner described.

65,045.—Method of Tempering Springs.—Wallace Barnes, Bristol, Ct.

I claim the employment of one or more coils, as shown and described, in the process of tempering springs.

65,046.—Brace for Boring Bits.—Harry S. Bartholomew (assignor to himself and G. W. Bartholomew), Bristol, Ct.

I claim the protuberance, a, upon the socket, A, with a corresponding depression, a', in the jaws, substantially as and for the purpose described.

65,047.—Steam Trap.—Henry W. Bartol, Philadelphia, Pa.

I claim, First, The arrangement of spring, A, in cylinder, A B A' B', so that when the steam enters the cylinder, the expansion of metallic spring, A, will close opening, E, as and for the purpose described and set forth.

Second, The spring, A, held and secured in proper place by means for ring bosses, K, and bevel notch, R, as and for the purpose described and set forth.

65,048.—Lathing Apparatus.—W. L. Beardsley, Binghamton, N. Y.

I claim the construction and use of the apparatus herein described and set forth.

65,049.—Washing Powder.—Henry Benter, Pittsburgh, Pa.

I claim a washing powder or compound composed of sal soda, or its chemical equivalent, cuttle-fish bone, and ultra marine, or other equivalent coloring matter, mixed in about the proportions above stated, and substantially in the manner and for the purposes hereinbefore set forth.

65,050.—Plow.—R. W. Biggs, Jacksonville, Fla.

I claim the combination and arrangement of the slotted stock, C, point or share, E, and semi-circular stationary adjusting plate, D, with each other and with a suitable plow beam, A, substantially in the manner and for the purpose herein set forth.

65,051.—Mechanical Movement.—P. Bloomsburg, Jr., and J. Molyneux, Bordentown, N. J., assignors to Bordentown Machine Co. Antedated May 16, 1867.

We claim the single eccentric, B, on the driving shaft, the eccentric rod, C, lever, D, and rod, F, in combination with the double crank on the driving shaft, the whole being arranged and operating substantially as and for the purpose set forth.

65,052.—Sewing-machine Shuttle.—Ezekiel Booth and Job A. Davis, Watertown, N. Y.

We claim the longitudinal spring, s, with the socket, B, attached, for the purpose of securing the bobbin, constructed and operating substantially as as set forth.

65,053.—Garden Hoe.—James H. Brewer, Atlas, Mich.

I claim turning up the ends of the blade, and forming upright cutters at right angles to the main blade, in combination with attaching the shanks to the outer and upper portion of the turned-up end of the blade to clear weeds and earth.

65,054.—Canal Lock.—John Burt, Detroit, Mich.

First, I claim discharging the water into and from the lock chamber of a canal in a diffused or divided state by means of a diaphragm or apertures formed in the bottom of the said chamber, substantially as shown and described.

Second, The herein-described mechanism discharging the water into and from a canal lock, the same consisting of tubes or conduits communicating with the higher and lower levels of the canal, and extending along the bottom of the lock chamber, and perforated so as to allow the water to enter or be drawn off from the said chamber at several points simultaneously and in a diffused state, substantially as shown and set forth.

Third The combination with the said tubes or conduits, of the valves for regulating the flow of water, the said valves, at each end of the tubes, coupled or united together so as to be operated simultaneously, substantially as shown and set forth.

Fourth, The combination with a tubular valve seat in which apertures are formed, diametrically opposite each other, of a tubular valve provided with corresponding apertures, the said valve and valve seat being arranged for operation relatively to the water tube or conduit, substantially as shown and specified.

Fifth, The water gate herein described, the same being made of steel or other suitable elastic material, and having a curved shape, as specified, so that when under pressure the sides of the said gate shall be held firmly and tightly against the quoins or guides in which it slides, substantially as shown and set forth.

Sixth, The combination with the elastic water gate, sliding vertically in in quoins or guides of the compensating weight for equilibriating the said gate, substantially as shown and described.

65,055.—Fire-proof Safe.—William H. Butler, New York City.

First, I claim the tesselated work or interspersed masses of steel united with a softer metal, B, by being rolled or forged together and afterwards hardened by sudden cooling so as to form a conglomerate metal of unequal hardness, the masses being arranged substantially as and for the purpose herein specified.

Second, I claim, in burglar-proof structures composed of more than one layer of plates, employing plates composed of soft iron joined with plates containing hardened steel by means of rivets, C, or their equivalents, arranged relatively to each other and to the several plates, substantially in the manner and for the purpose herein set forth.

65,056.—Steam Engine.—Caleb Cadwell, Waukegan, Ill.

First, The double-piston cylinder, L, without heads, and having the valve, 6, constructed and arranged with reference thereto, substantially as described.

Second, The pump valve, 2, having the shaft, Q, attached and operated, as described and set forth.

65,057.—Chalk-line Marker.—John W. Carter, New York City.

I claim the use or employment of the spindle and cord when the same shall be constructed and combined, substantially as shown, for the purpose indicated.

65,058.—Curtain Fixture.—Marvin Converse, Jordan, N. Y.

I claim the sliding frame, C, carrying the curtain roller and journals, moving freely upon the edge of the window frame on the guide rod, B, in combination with the cords, A E' and D', for raising and lowering the curtain, substantially as described.

65,059.—Harvester Rake.—F. E. Cook, Seville, Ohio.

First, I claim the pivoted curved bar, B, sleeve, L, and rake, K, in combination with the rod, M, and cam, E, as and for the purpose set forth.

Second, The notched wheel, F, springs, I and J, in combination with the bar, B, and rake, as and for the purpose described.

Third, The nut and screw, with lug, in combination with the sleeve, L, and bar, B, so as to allow the rake to fall back in place in the spaces, a, before it is drawn across the platform in discharging the gaven, as and for the purpose specified.

65,060.—Bench Hook or Dog.—Charles T. Crane, Lowell, Mass. Antedated May 19, 1867.

I claim a bench hook consisting of a frame, a, socket, b, for the sliding spindle, d, with hook, e, attached, and spring, f, all as mechanically arranged for the purpose herein described, and the manner fully set forth.

65,061.—Bed Bottom.—Charles Croley, Dayton, Ohio.

I claim the construction of the supporting pieces, a and b, with slotted ends, substantially as and for the purpose specified.

65,062.—Shuttle for Sewing Machines.—Job A. Davis, Watertown, N. Y.

I claim the lever pad, s, screw, w, and coil spring, c, when constructed and arranged, substantially as and for the purpose set forth.

65,063.—Compound for Refining Cider, Ale, etc.—Wm. M. Davis (assignor to himself and Wm. L. Beckwith), Cleveland, Ohio.

I claim the composition above described, compounded of the ingredients above mentioned, or their known equivalents, substantially as and for the purpose set forth.

65,064.—Rock Drill.—Daniel S. Early, Hummelstown, Pa.

First, I claim the drill rod, constructed with the fixed collar, K, and shoulder, L, in combination with the tappets, G, and slotted crosshead, H, substantially as described for the purpose specified.

Second, The tappets, G, with shoulders, g, and turned ends, h, arranged with the slotted crosshead, H, in combination with the drill rod, I, having fixed collar, K, and square shoulder, L, substantially as described for the purposes specified.

65,065.—Apparatus for Evaporating Liquid.—Lewis C. England, Philadelphia, Pa.

First, I claim a stirrer composed of main shaft, L L', teeth, D D, upright, U S, combined with evaporator, B P, by means of journals, O, capable of a rocking motion, constructed substantially as described.

Second, The combination of frame, o o, tapering frame, o' o', and crank screw, S S C, working together in the manner and for the purpose described.

Third, Box, B P, false metallic bottom, de de, frames, o o o' o', crank screw S S C, and stirrer, L L', all combined and working together in the manner above described and for the purpose set forth.

65,066.—Pipe Cutter.—Theodore S. Foster (assignor to himself and John P. Sabin), Fitchburgh, Mass.

First, I claim the knife, b, constructed as described and attached to the claw, substantially in the manner and for the purpose above specified.

Second, The combination of the knife, b, with the friction rollers or their equivalent, and the feeding screw as above described.

65,067.—Curtain Fixture.—Charles H. Fowler, West Roxbury, Mass.

I claim the combination with a curtain roller of a sliding or spring box or clamp, under such an arrangement that the said box or clamp shall not only constitute the means by which the roller and curtain are held in position, but also support the journal of the said roller at all times and form the bearing in which it resolves as herein set forth.

I also claim the combination of the journal of a curtain roller with the recessed bracket and sliding or spring bearing substantially in the manner and for the purposes herein specified.

65,068.—Shaft Tug.—Kasson Frazer, Syracuse, N. Y.

I claim as new article of manufacture a shaft tug composed of the parts, A B C, substantially as and for the purposes described.

65,069.—Brick Press.—E. R. Gard, Chicago, Ill.

First, I claim a follower, S, provided with one or more rollers, u u, running under and in combination with flanges, f f, projecting from the track nearly along its entire length, substantially as and for the purposes herein specified.

Second, I also claim the removable journals, V V, for the supporting roller, U, of each follower, the said bearings being provided with oil cavities for containing oil and some porous, or capillary substance, to keep the journals constantly lubricated, substantially as herein set forth.

Third, I also claim an adjustable top or lid, X, for the followers, by means of the washers, x x, or any equivalent thereof, for the purposes herein described.

Fourth, I also claim the combination of the projecting rim, b, of the mold wheel, and the supporting roller, L, for the purpose set forth.

Fifth, I also claim the self-lubricating journal box of the roller, L, constructed substantially as herein specified.

Sixth, I also claim the adjustable pressure portion, G, of the track when combined with india-rubber, or equivalent, springs, H H, substantially as and for the purpose specified.

65,070.—Mode of Forming the Edge of Water-proof Soles.—Joseph H. Greenleaf, New Haven, Conn.

I claim the leather edge for soles constructed and formed substantially as herein set forth, as a new article of manufacture.

65,071.—Apparatus for Forming Edge of Water-proof Soles.—Joseph H. Greenleaf, New Haven, Conn.

I claim the apparatus substantially as herein described for forming the edge of soles.

65,072.—Chair and Bedstead.—Joseph Greenleaf (assignor to himself and O. F. Case), New Haven, Conn.

I claim the combined chair and bedstead herein described having the seat, H, and back, G, attached thereto, and so as to be folded, the seat, H, down toward the back, and the back, G, backward down on the frame, substantially as herein set forth.

65,073.—Corn Planter and Fertilizer Combined.—Benjamin F. Grimes, Dawsonsville, Md.

First, I claim the arrangement of the corn hoppers, C C, fertilizer hoppers, D D, discharge tubes. E E, and inclined tubes, F F, substantially as and for the purpose herein set forth,

Second, The combination of the bar, G, hinged arms, H H, levers, I I, slides, J J, and dropping slides, N N N' N', substantially as herein described.

Third, The combination of the bar. P, levers, P' P', rods, Q' Q', bar, P2, and valves, Q Q Q2 Q2, all arranged and operating substantially as herein described.

Fourth, The combination with the bar, G, and its described connections with the dropping mechanism of the lever, R, arranged and employed in the manner and for the purpose explained.

Fifth, The combination of the rack shaft, T, arms, T1 T2, tappet or projections, b. notch post, U, and spring catch, V, arranged and operating in connection with the dropping mechanism, as and for the purpose specified.

Sixth, The stirring shafts, O O o2, in combination with the levers, I I, links, o o, and lugs, o' o' as described.

Seventh, The discharge tube, E, when made in two or more parts and hinged in order to adapt the lower section to be turned up and held in its raised position, substantially as described.

Eighth, The arrangement within the discharge tubes of the deflecting pieces or plates, a, substantially as and for the purpose set forth.

Ninth, The weights, G' G' in combination with the bar, G, as and for the purpose explained.

Tenth, The frames, h h, carrying the shovels, h', and coverers, h2 h2, in combination with the supporting bar, A, slotted pendants, A4 A4, and adjusting pins, a4, all arranged and operating in the manner and for the purpose explained.

Eleventh, The combination with the dropping slide of the fertilizer hopper, D, of the flap valve, d, and ball or weight, e, applied and operating in the manner and for the purpose specified.

65,074.—Grain Cleaner.—J. A. Hall, Greenfield, Ind.

First, I claim the shaking shoe, C, hinged to the frame and agitated by contact with the circular series of cams or projections on the head of the rotating screw, substantially as described.

Second, The rotating screw, G, in combination with the shaking shoe, C, and the shutter, P, for regulating the discharge, substantially as described.

65,075.—Steam Cock.—Albert Hallowell (assignor to himself and Horace R. Barker), Lowell, Mass.

I claim the combination as well as the arrangement of the spring, s, or the same and either or both the chambers, n P, with the auxiliary conical valve, e, and seat, f, the cap, F, the hand wheel, I, and the key, E, employed for effecting by aid of the screw, c d, the vertical movements of the main valve, A, with respect to its seat, B, as described.

65,076.—Washing Machine.—William H. Hanson, Albion, N. Y.

First, I claim the rotary brush, E, one or more rollers, I, and the screw, K, in combination with the corrugated board, H, operating in the manner and for the purpose shown and described.

Second, I claim in combination with the above the roller, L, and the box, A, having two compartments, C and D, substantially as shown and described.

65,077.—Machine for Cutting Hair, Grass, etc.—C. F Harlow, Boston, Mass., and E. H. Perry, Roxbury Mass.

First, We claim so combining, arranging and operating the two sectoral plates, A B, as to be enabled when desirable, to operate them by one hand, essentially as described.

Second, We claim combining the two plates, A B, and their operative mechanism in such manner as to obtain a number of reciprocating movements of the said cutter plate, B, over the plate, A, to one movement of the handles, h h' or the lever, F, substantially in the manner as set forth and explained.

Third, We claim the mechanical construction of the machine substantially as above described, that is the combination of the two plates, A B, bar, D, lever, F, provided with the handles, h h' rack and pinion, e and d, and cam groove, k, in manner and to operate as specified.

Fourth, We also claim the peculiar devices for operating the cutter plate, B, consisting of the rack, e, applied to the lever, F, the pinion, d, and the disk, b', with its cam groove, k, operating in connection with a stud, upon the cutter plate, substantially in manner and to operate as described.

Fifth, We claim the employment of the friction roller, i, for the purpose of keeping the two plates, A B, in contact, and relieving the friction between the latter and the bar, D, substantially as set forth.

65,078.—Indicating Apparatus for Oil and Other Stills.—Walter Hart, Philadelphia, Pa.

What I claim is an apparatus substantially such as described, which when applied to a still or other evaporating vessel, will show externally the quantity, specific gravity, temperature, pressure, color and rate of evaporation of the contents of the still, by means of passages and indicators, substantially as described.

65,079.—Car Coupling.—Andrew Hartman, Canton, Ohio.

First, I claim the peculiarly shaped apron or balance, D, of the pin, E Z D, so arranged and constructed as to act both as a balance, and a part of the mouth of the coupling, substantially in the manner and for the purpose herein specified.

Second, The peculiar combination and arrangement of the parts, A and B, rotating pins, E Z D, bolt, H, block, J, spring, L, iron, K, plus, O O, slots, S S, catch, C, with handle, I, the several parts being arranged as hereinbefore shown, and the whole forming a self-acting coupling operating substantially in the manner specified.

65,080.—Machine for Jointing Staves.—George R. Hay (assignor to himself and J. R. Seely), Edgerton, Ohio.

First, I claim the link, e, rod d, spring, c, pin, N', and clamps, O O', in combination with the vibrating frame, substantially as and for the purpose set forth.

Second, The adjustable vibrating frame provided with the devices for curving and holding the stave, and detaching said stave when finished, constructed and operating substantially as described.

65,081.—Vise.—John S. Hoar (assignor to himself and C. Hastings and N. C. Cutter), West Acton, Mass.

I claim the combination of the vise with a table or other support by means of the plates, A and B, axial pin, e, bolts, c, and nuts, d' all constructed and arranged substantially as described.

I also claim in combination with the jaws, C and D, the anvil, G', attached to the jaw, C, and arranged in relation thereto as described.

65,082.—Steam Water Elevator.—W. L. Horne, Batavia, Ills.

I claim a water elevator consisting of the exterior cylinders a, and interior valve cylinder, b, and valve c, operated in the one direction by steam and in the other direction by water combined and arranged as set forth.

65,083.—Door Stop.—G. W. Hunt (assignor to J. S. Gray and J. S. Watson), Winchendon, Mass.

I claim a combined metallic and elastic door constructed and operating substantially in the manner herein described for the purposes set forth.

65,084.—Compound for Silver Plating.—E. Hunter, M. D., Cleveland, Ohio.

I claim the herein described compound for cleaning silver ware and cleaning and re-plating plated ware, or ware made of copper or any of its alloys, of any other metals or alloys.

65,085.—Mosquito Bar.—John S. Hunter, Hartford, Conn.

I claim the arrangement of the bows, B, more or less in number and combined with an adjustable socket, C, so as to be attached to the bedstead and to operate substantially as set forth.

65,086.—Blind Fastening.—S. W. Huntington, Augusta, Me.

I claim the combination with the catch bar as described of the socket formed in two parts with a chamber for receiving the head of the catch bar and for allowing slight vertical movements of the same, substantially as and for the purposes herein shown and set forth.

65,087.—Gang Plow.—Joseph and James Ingham, San Jose, Cal.

We claim, First, The movable pivoted bars, C C' with the segments, D D' wheels, E E' and pinions, F F', to raise and lower the plows, substantially as described.

Second, The two part axle, G with the vertical connecting necks, K K' to make the plows cut to an equal depth as described.

Third, The eyes, L L' together with the bar, M, and screw, m, for the purpose of regulating the draft, substantially as described.

65,088.—Melodeons, etc.—S. A. Jewett, Cleveland, Ohio.

I claim the tappets or independent manuals, K, rods, J, levers, G, and rods, H, in combination with the keys, A, and reeds, C, in the manner and for the purpose set forth.

65,089.—Turning Lathe.—William Johnson, Lambertville, N. J.

I claim, First, The continuous cover, M, over the feed screw, G, said cover passing through an aperture in the slide rest and in other respects arranged as set forth.

Second, Constructing the feed nuts to allow the cover to pass between them and the peculiar arrangement of eccentric movable arm and connecting bars, whereby the feed nuts are made to move equal distances in opening and closing the feed screw by rods attached to said nuts at points unequally distant from their center of motion. The whole combined and operating substantially as herein set forth and described.

65,090.—Punch for Car Tickets, etc.—R. J. Kellett, San Francisco, Cal.

I claim a punch with an attachment, E, or its equivalent for holding the clippings or chips of tickets in the manner substantially as and for the purpose specified.

65,091.—Elastic Button for Carriages.—Theodore E. King, Painesville, Ohio.

First, The adjusting screw C, in combination with the rubber collar D', arranged in relation to the curtains, in the manner and for the purpose substantially as set forth.

Second, The rubber collar D,' and adjusting screw C, as arranged in combination with the button hole E, and curtains in the manner as described.

65,092.—Compound for Preventing Incrustation in Steam Boilers.—H. Frederick Knoderer, Sr., and L. F. Knoderer, Columbus, Ohio.

We claim the application of a compound or preparation of two parts of common alum and one part of common glue prepared and applied as above specified to prevent and remove the accumulations and incrustations of steam boilers and the pipes and tubes belonging thereto as hereinbefore specified and substantially set forth.

65,092.—Rudder.—F. W. Kuhnert, Rochester, N. Y.

I claim the combination with the main rudder B, of the series of auxiliary rudders E E E, arranged in the keel one after another and capable of being connected with and disconnected from the main rudder, in action, as herein set forth.

65,094.—Gang Plow.—L. B. Lathrop, San Jose, Cal.

First, I claim the rotary cutters d, attached to the wheels C, and forming flanges thereon, for the purpose of acting as land sides for the plows, substantially as set forth.

Second, The axle B, when arranged obliquely below the tongue A, and when adjustable by means of the screw bolt a, and slotted arm b, substantially as and for the purpose herein shown and described.

Third, The devices for raising and lowering the plows, consisting of the screw K, rods i and h, and of the axle B, lugs f and g, bar F, and bolts e, respectively, as set forth.

Fourth, The double tongue A M, in combination with the wheel I, supporting the end of the main tongue, and with the hinges l m n and o p s, substantially as herein shown and described.

Fifth, The plow beams E, when bent so as to form off-sets at the top of the mold-boards, substantially as and for the purpose herein shown and described.

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65,095.—TOCACCO CUTTER.—Nehemiah W. Lee, North Providence, R. I.

I claim the knife D, with its rack b, sliding vertically in the frame B, and operated against the resistance of springs E, or their equivalents by the lever G, with its movable fulcrum and toothed sector F, substantially as described for the purpose set forth.

65,096.—TRACE FASTENING.—Burdette A. Lewis, New Britain, Conn., assignor to himself and Jeremy W. Bliss, Hartford, Conn. Antedated May 16, 1867.

I claim the projection e, upon the button c in combination with the latch C, and protuberances h, substantially as and for the purpose described.

65,097.—VISE.—Joseph H. Lewis, Duxbury, Mass.

First, I claim the arrangement and combination of the movable jaw e, and internal threaded rotating screw i, with the stationary support and jaw a, and fixed external threaded screw, g, substantially as described.

Second, I also claim the arched slide d, in combination with the support a, of the stationary jaw substantially as and for the purposes set forth.

65,098.—BOLSTER FOR RAIL ROAD CAR.—John Marquis and John W. Kimmell, Crestline, Ohio.

First, We claim the clamping pieces F F, constructed in the manner and for the purpose herein specified.

Second, The combination of the rods O O, with nuts g g g g, thereon and the clamping pieces F F, in the manner and for the purpose specified.

Third, The arrangement and combination of the clamping pieces F F, and rods O O, as claimed in second claim with the pieces A B and C, and connecting pieces D D, the whole forming an adjustable bolster in the manner and for the purpose herein specified.

65,099.—CERTRIFUGAL PUMP.—Carlo Federici Martorana, Baltimore, Md.

First, The pump consisting of the wheel W, constructed as described and arranged to operate as and for the purpose herein set forth.

Second, I claim the arrangement of the pump wheel W, and tube or case T, with the valves d, in the bottom of a floating platform or vessel substantially as and for the purpose set forth.

65,100.—MACHINE FOR MAKING SCREWS.—Benjamin A. Mason, New York City.

First, I claim the series of intermittently revolving jaws, in combination with the revolving shaft s3, cutter 15, and cone t1, constructed, arranged and acting substantially as specified.

Second, I claim the hanging saw u, actuated in the manner and by the means substantially as described in combination with the blank holders o' for the purposes and as set forth.

Third, I claim the pointing tool secured upon the end of the revolving spindle v' in combination with the lever 23 cam 21, and blank holders o' as and for the purposes set forth.

Fourth, I claim the arrangement and combination of all the mechanism herein described for shaving nicking and pointing screw blanks as set forth.

65,101.—BRIDLE.—J. Franklin Mason, Bentonsport, Iowa.

I claim the rounded strap, in combination with guards and rings, to be secured to the horse's under jaw in the manner and for the purpose herein described.

65,102.—COTTON BALE TIE.—Matthew F. Maury, New Orleans, La.

I claim the plate A, when provided with the folding flanges a a1, and shoulders b b1, as described for the purpose set forth.

65,103.—BREECH LOADING FIRE ARMS.—Reuben McChesney, Utica, N. Y.

First, I claim sustaining the forward extension of the breech piece upon a vibrating fulcrum piece a, substantially as described.

Second, The combination of the breech piece D, fulcrum piece a, and latch d, operating substantially in the manner set forth.

Third, Constructing the fulcrum piece a, so as to receive through it the spring a', which depresses the breech piece when the latter is released from the latch d, substantially as described.

Fourth, The arrangement of the cartridge shell extractor l l', so as to be operated upon with the full force of the spring a', through the agency of the intermediate slotted device n n' and the breech piece D D, the said parts being thrown into action by the act of cocking the arm substantially as described.

Fifth, Constructing the hammer G, with a flange g' for entering a recess g2 formed in the breech piece and assisting in holding the latter firmly in place, substantially as described.

Sixth, Constructing the latch d, of the breech piece so as to receive the forward end of the main spring J, through it, said latch d, being pivoted upon the trigger pin e', substantially as described.

Seventh, Applying the pin i, to the breech holding latch and operating said pin by the projection g, on the inside face of the hammer G, substantially in the manner shown and described.

65,104.—HINGING LID OF TEA KETTLE.—William L. McDowell, Philadelphia, Pa.

I claim a wide mouthed tea kettle having a hinged lid attached consisting of the two segments D, E, coupled together and applied so as to operate substantially as described and for the purposes specified.

65,105.—BAG HOLDER.—James Melcher, Minneapolis, Minn.

First, I claim constructing the lower part of hopper I, with an hinged side, and connecting said side to the opposite side of the hopper by means of a flexible material in order that it may accommodate itself to the mouth of the bag substantially as set forth.

Second, In combination with the hinged side and flexible material, I claim spring M, for the purpose of retaining the mouth of the bag open to its greatest extent, substantially as described.

65,106.—HARVESTER RAKE.—Lewis Miller, Akron, Ohio.

I claim in combination with a revolving arm carrying a pivoted rake or fork upon its outer end, a slide and connecting rod, that is operated by a cam and guide, and attached to said rake or fork so that while the arm moves in a true circle the rake or fork may assume different positions upon it, substantially as and for the purpose described.

65,107.—SNAP HOOK.—Charles E. Mitchell, New Britain, Conn.

I claim a rigid pressure attachment E, or its equivalent, acting against the heel of the latch, to firmly close it with the hook, substantially as and for the purpose described.

65,108.—MANUFACTURE OF ALCHOLIC SPIRITS.—J. Neely and Simeon Allen, Buckingham County, Va.

First, We claim the manufacture of spirituous liquors and alcohol from the juice of maize or Indian corn, substantially as herein set forth.

Secondly, We claim as a new article of manufacture spirituous liquors or alchohol made from the expressed juice of corn stalks.

65,109.—CAR WHEEL.—D. P. Nickerson, Cleveland, Ohio.

First, I claim the shell A, elastic ring F, and disk I, provided with the shoulder or flange C, in combination with the elastic rings H.

Second, The clutches L E, and disk in combination with the elastic rings and shell A, substantially as and for the purpose set forth.

Third, The annular shoulders D M' rings H, plate M and shell A, arranged substantially as and for the purpose set forth.

65,110.—FURNACE FOR HEATING AND WELDING.—George Nimmo, Jersey City, N. J.

I claim the welding and heating furnace formed with the heating chamber b, fire and and welding chamber a, and openings d e e and f, in the manner and for the purposes set forth.

65,111.—PIPE WRENCH.—J. L. Ordner, Cleveland, Ohio.

I claim hook F, and pivoted nut E, as arranged and operating within and in combination with the slotted shank B, as and for the purpose set forth.

65,112.—SECTIONAL TAKE UP FOR CORSET LOOMS.—Solomon Ottenheimer, New York City.

I claim the springs o, applied between the stationary shaft e, and the toothed ring h, in combination with the wheels d, of the sectional take up roller of a loom for weaving corsets and other irregular fabrics substantially as set forth.

65,113.—HORSE RAKE AND HAY SPREADER.—George N. Palmer, Green, N. Y.

First, I claim the arrangement and combination of the balanced frame B, B, short levers F F, and the rake head E, in the manner herein described for the purposes set forth.

Second, I claim regulating and adjusting the tilting motion of the frame B, by the screw hooks k k, and springs m m, as described.

Third, I claim the combination of the pawls e e, ratchets b b, and thumb screws c c, constructed and arranged substantially as and for the purposes specified.

65,114.—VISE.—B. F. Perkins, North Adams, Mass.

I claim the spring B, or its equivalent in combination with the screw D, and lever C, as herein described, and for the purpose specified.

65,115.—COUNTER AND DESK SEAT.—W. R. Pomeroy, Millersburg, Ohio.

I claim the bracket B, seat C, lugs D, and springs I, as arranged in combination with the counter A, for the purpose and in the manner as set forth.

65,116.—BALANCE WHEEL OF WATCHES.—George Ramsay, Clyde, Ohio.

First, I claim a watch balance wheel constructed with spring arms as and for the purpose set forth.

Second, The balance wheel with spring arms in combination with the guards, substantially as and for the purpose set forth.

65,117.—SHANK LASTER.—L. Rastetter and A. Simcox, Fort Wayne, Ind.—Antedated May, 16, 1867.

We claim the shank A, handle B, stationary jaw C, movable jaw E, spring j, adjustable fulcrum D, combined, and operated as described and constructed in the manner and for the purpose specified and set forth.

65,118.—FASTENING SEATS TO CARRIAGES.—Martin C. Remington, Auburn, N. Y.

First, I claim the device for fastening seats to carriages and constructed substantially as described.

Second, The eccentric C, and sliding hook E, substantially as described for the purpose specified.

Third, The locking device consisting of the spring toothed lever D, toothed ring F, of the hook E, in combination with the eccentric C, substantially as described.

65,119.—SHIFTING RAIL FOR CARRIAGE TOPS.—Uel Reynolds, New York City.

I claim the wooden shifting rail to which the metal slat irons and prop blocks are attached as set forth.

65,120.—BOOTS AND SHOES.—E. P. Richardson, Lawrence, Mass. Antedated May 16, 1867.

I claim the system or mode of fastening the soles of boots and shoes, by means of barbed or corrugated nails or pegs, either with or without heads and driven either from the outside or inside of the boot or shoe, substantially as herein set forth, and for the purpose specified.

65,121.—SAND PUMP.—E. A. L. Roberts, Titusville, Pa.

First, I claim the combination substantially as and for the purposes herein set forth and described, of a tube piston and foot valve, the latter being opened for the purpose of discharging the contents of the pump by means of the stem k, or its equivalent whether attached to, or separate from the valves.

Second, The perforations s, as arranged in relation to said pump for the purposes herein set forth.

65,122.—PROCESS OF REDUCING AND REFINING METALLIC ORES AND OXIDES.—S. C. Salisbury, New York City.

First, I claim the application and use in blast and other like furnaces for reducing metallic oxides, of a blast of hydrogen and oxygen gases, or their equivalent when heated to a temperature of from 700° to 800°, Fahrenheit, or thereabouts for the purposes set forth.

Second, The use in such furnaces in combination with such blast of hydrogen and oxygen gases or their equivalent heated as described, of carbon gas, when free from or obtained from hydrocarbons free from sulphur, phosphorus, ammonia, etc., for the purposes set forth.

Third, The use in such furnaces of such blast of hydrogen and oxygen gases or their equivalent, so heated as described, and of such carbon gas free from sulphur, phosphorus, ammonia, etc., in combination with the ordinary air blast, for the purposes set forth.

Fourth, In combination with blast and other furnaces used for reducing ores, the use of a compound or divided tweer constructed substantially as described, for supplying to such furnaces such blasts of different character, substantially as and for the purposes sent forth.

Fifth, The use in blast and other furnaces used for reducing ores of manganese, substantially as and for the purposes set forth.

65,123.—CUTLERY.—Henry Sanderson, Sheffield, Eng., assignor to Wm. Sanderson, New York City.

I claim uniting the handle and blade in the manner substantially as herein described.

65,124.—PIPE VISES.—D. Saunders, Brooklyn, N. Y.

I claim the improved pipe vise herein described turning on the axis, C, and having the side opening, H, to allow the introduction and removal of the work, the several parts being combined and arranged substantially as and for the purpose herein set forth.

65,125.—STRAW CUTTER.—W. D. Schooley, Richmond, Ind.

First, I claim the arrangement of the balance wheel, B, and main shaft, C, relative to the main frame, and knife sash, E, substantially as described and for the purposes set forth.

Second, The use of the lever, k, when provided with the adjustable head, l, and operated by the cam, D, and to operate in combination with the rods, m m, and levers, j j, for the purposes specified.

Third, The adjustable bearings, O, as described and set forth.

Fourth, The keys, u u, for adjusting the knife frame, as shown and described.

Fifth, The guard, w, when made detachable, substantially as described and set forth.

65,126.—OIL CUP.—H. K. Sears and S. L. Holt, Hartford, Ct.

We claim the combination of the passage, a, valve, d, guide, i, and rod, e, all arranged to operate substantially as and for the purpose described.

65,127.—REGISTER POINTS FOR PRINTING APPARATUS.—John F. Shearman, Brooklyn, N. Y., assignor to E. S. Dodge & Co., New York City.

First, I claim the case, K, inclosing the point, I, and open on one side to allow the operation of the edge of the blade, G', or its equivalent, so as to operate the point therein in any position in the slot, substantially in the manner and for the purposes herein set forth.

Second, I claim in combination with the above, the clamp, L, and adjusting means, N, or its equivalent, adapted to be conveniently operated from above the feed board, so as to set the point in the desired position in the slot, c, substantially as herein specified.

Third, I claim adjusting the turning plate, C, by operating from the upper side, all substantially in the manner and for the purposes herein set forth.

65,128.—PLANING MACHINE FOR WOOD.—P. T. Smith. Salem, Ohio.

First, I claim the adaptable shaft, G, dowel points or clutch, c', socket joint, a, in combination with the feed rollers, E F, and springs, K, as and for the purpose substantially as set forth.

Second, The vertical revolving cutters, Q, spring guides, d', and f, as arranged in combination with the saw, g, for the purpose and in the manner described.

65,129.—KETTLE.—Alfred Sower, New York City.

I claim the chamber, E, in combination with the tubes, C, and pipes, F G, substantially as herein shown and described for the purpose specified.

65,130.—SHEEP SHEARER.—I. H. Spelman, Baconsburg, Ohio.

I claim the combination of a shearer for the purpose and in the manner as substantially described, as a new article of manufacture.

65,131.—CARD ON LABEL HOLDER.—Edward F. Stephens, Towanda, Pa.

I claim the form of the plate as cut of one piece of metal, the points marked C D E and F, which secure the holder to the drawer, or so forth, without the use of nails or other means of fastening, and the flanges, G H and I, so turned as to hold the card or label and permit the same to be changed without detaching the holder.

65,132.—MACHINE FOR MAKING FERRULES.—Jeremiah Stever and John A. Way, Bristol, Conn.

First, We claim the reciprocating bending dies, J J, slides, L L, and mandrel, R, combined and arranged for joint action, substantially in the manner described.

Second, We claim in combination with the above the presser, R", substantially as and for the purpose described.

65,133.—GRINDING MILL.—Isaac Straub, Kenton County, Ky.

I claim the bolt, b, when used in combination with trambolts, a a a a, for the purposes substantially as described.

65,134.—MANGLE.—R. A. Stratton, Philadelphia, Pa.

First, I claim the combination of the rollers, E E' secured to the adjustable spring standards, D D', and the roller, F, secured to the spring standard, D', the whole being constructed and arranged as and for the purpose set forth.

Second, the shield, m, arranged in respect to the rollers as and for the purpose described.

65,135.—PNEUMATIC SPRING.—D. B. Strope, Fort Wayne, Ind.

First, I claim the construction and arrangement of the hollow piston in its relation to the oil contained in the reservoir or outer cylinder, in the manner and for the purpose herein described.

Second, I claim the combination of the packing, D, elastic packing, I, metallic packing ring, E, and elastic flange or packing, F, with the gland, C, and piston, B.

Third, I claim the combination of the studs, K, cylinder, A, and piston, B, substantially as shown and described.

Fourth, I claim the combination of the cock, G, valve, M, and cylinder, A, when arranged substantially as shown and described.

65,136.—OIL STILL.—Dexter Symonds, Lowell, Mass., assignor to himself, Benj. Woodward, and M. S. Marshal.

I claim in stills for deodorizing and purifying oils, where the substance or material used and the process of deodorizing and purifying are herein described.

I claim the employment of one or more screens in the manner and for the purpose substantially as set forth.

And I also claim the employment of a screen or screens in any still where the substance or material under operation is liable to foam or rise, as set forth.

65,137.—MODE OF PURIFYING AND DEODORIZING OIL.—Dexter Symonds, Lowell, Mass., assignor to himself, Benj. Woodward, and M. S. Marshal.

I claim in deodorizing and purifying hydro-carbon or other oils, the use of the substances or materials herein specified and in the manner set forth.

65,138.—MACHINE FOR CUTTING SHEET OR BAR METAL.—Timothy F. Taft, Shrewsbury, Mass, assignor to Augustus Rice, Worcester, Mass.

I claim the application to the lock shears above described of the two arms, J J, with bolt, K, and nut, L, or their equivalents, substantially as described.

65,139.—COMPOSITION FOR CLEANING METALS, WOOD, AND OTHER ARTICLES.—C. S. Toms, Utica, N. Y.

I claim the composition of matter substantially as herein described, with and without the Fullers earth.

65,140.—GATE FOR WATER WHEELS.—Garret Vliet, Milwaukee, Wis., assignor to Wm. Vliet, Green Lake Co., Wis.

I claim solid metal gate, C, with water ports through its metallic water guides, D, projecting through the ports in gate, C, and curved at their inner ends to conform to the shape of the wheel, for the purpose of giving the water the proper direction, metal rings, E and F, bolts, G, and pinion, H, all arranged and combined substantially as and for the purpose described.

65,141.—TUCK MARKER OR CREASER FOR SEWING MACHINES.—Anna Weissenborn, New York City.

First, I claim the combination of a creasing or marking wheel or roller, A10, sliding in unison with a sliding blade, A12, when applied to a sewing machine, in such a manner that the creasing or marking can be done during the process of sewing, substantially as described.

Second, I claim also for giving the downward pressure of the creasing wheel against an edged or grooved instrument attached to the sliding blade, A12, the employment of a spring or set screw or a lever, substantially the same as set forth.

65,142.—COMBINED MATCH BOX AND TAPER HOLDER.—John A. Whipple, Cambridge, Mass.

I claim the combination of the casing, A, the match holder, B, and hinged socket, S, substantially as and for the purpose pecified.

65,143.—PUNCHING PRESS.—M. G. Wilder, West Meriden, Ct.

First, I claim the combination of the eccentric, G, stock, A, shaft, B, lever, E, arranged and operating substantially as described.

Second, I claim the combination of the eccentric, G, stock, A, shaft, D, levers, E K, arm, L, with the wheel, H J, substantially as and for the purpose described.

65,144.—HORSESHOE.—Albert S. Wilkinson, Pawtucket, R. I.

First, I claim an elastic or spring connection, L, for connecting the heels of expanding shoes, substantially in the manner and for the purpose set forth.

Second, In a jointed horseshoe as described, and having a continuous clip, I claim the toe clip, a, and heel clips, e e, provided with the projecting arms, e2 e2, in combination with the elastic spring connection, L, substantially as described.

65,145.—HORSESHOE.—Albert S. Wilkinson, Pawtucket, R. I.

First, I claim in double shoes an expansion point which consists in slitting the upper and lower plates laterally so as to break joints, so that the toe clip acts as a spring joint to allow the heels of the shoe to expand laterally, substantially in the manner and for the purpose set forth.

Second, I claim the double shoe, A a, having an expansion joint as described, in combination with the toe clip, B, provided with a loop, c, and retaining bands, f f, substantially as described.

Third, I claim the double shoe, A a, having an expansion joint as described in combination with the toe clip, B, provided with a loop, c, retaining bands, f f, and heel rests, j j, the whole being constructed and operating substantially in the manner and for the purpose set forth.

65,146.—SASH TIGHTENER.—J. D. Winslow, Wilmington, Del.

I claim attaching to window sashes the wedge-shaped piece, g, together with the pin or stop, b, as shown in the drawings and herein described, as a sash tightener to exclude wind and storms and prevent the sash from rattling.

65,147.—APPARATUS FOR DISTILLING TURPENTINE.—J. E. Winants and J. F. Griffen, New York City.

We claim melting the lower portion of the mass of crude material in the bottom of the supply tank or hopper, and there partially straining it, substantially in the manner described and for the purposes set forth.

We also claim the employment within a closed chamber, D, of a steam-heated strainer, F, constructed and operating substantially as described for the purpose set forth.

We also claim the employment in combination with the chamber, D, and steam-heated strainer, F, of one or more auxiliary sieves or strainers, substantially as described.

We also claim the employment, in combination with a strainer confined within a chamber of a cleaning device or scraper arranged to be operated from the outside of the chamber, substantially as described.

We also claim making the strainer chamber, D, with windows, as and for the purposes specified.

We also claim the employment within a closed vessel, K, of one or more steam-heated disks or evaporators, when formed with a scroll-shaped or helical groove in the passage of the liquid, substantially as described for the purpose set forth.

We also claim forming the still with windows substantially as described for the purposes set forth.

We also claim supplying the superheated steam directly to the evaporators, carrying it thence to the steam strainer, and lastly to the melting worm, so as to heat these several devices to different temperatures, as hereinbefore described for the purposes set forth.

We also claim the combination or combined arrangement of the supply hopper, melting coil, strainer, and still with the heating medium, when operating together in substantially the manner hereinbefore described for the purposes set forth.

65,148.—CLOTHES WRINGER.—Geo. L. Witsil (assignor to himself and Wm. Darmon and Geo. W. Griffin), Philadelphia, Pa.

First, I claim the combination of the roller, A, spur wheel, G, and frame, F, including the jaws, F2 F3, and the roller, A1, adjustable pinion, G1, and frame, D, including the jaws, D3 D4, said parts being respectively constructed and the whole arranged to operate substantially as and for the purpose set forth.

Second the arrangement of the rollers at A and A1, when both are actuated positively, frames, D and F, including the jaws, F2 F3 and D3 D4, block, D1, stems, D2, and spiral springs, E, substantially as set forth.

Third, In combination with the rollers, A and A1, the spur wheel, G, and slotted pinion, G1, cross piece, H, rigidly attached to the shaft of the upper roller and washer, I, substantially as and for the purpose set forth.

65,149.—GRAIN CONVEYING MACHINE.—S. W. Wood, Cornwall, N. Y.

I claim a reservoir, B, and weighing apparatus or scales, H, in combination with the receiving and conveying pipes or passages, C D, air pump, A, and the governing valves constructed and arranged to operate substantially as and for the purposes herein specified.

I also claim the perforated partition or screen, L, in combination with the reservoir, B, receiving and conveying pipes, C D, air pump, A, and valves, substantially as and for the purpose herein set forth.

I also claim the devices, or their equivalents, for the introduction of air into the receiving and conveying pipes, C D, in addition to that introduced with the grain, substantially as and for the purpose specified.

I also claim the arrangement of the devices, or the equivalent thereof, for introducing grain into a conveying pipe of passage, substantially as shown in figs. 3 and 4, and for the purpose herein specified.

65,150.—PROP FOR CARRIAGE TOPS.—Charles R. Abbott, Elmira, N. Y.

1st, I claim the shank, B B', when made in two parts, and constructed and operating substantially as and for the purposes set forth.

2d, The shank, B B', in combination with plate, A, ferrule, C, and screw, D, substantially as and for the purposes set forth.

3d, Securing the shank, B B', and ferrule, C, together, by means of tongue and groove, o, and pins and holes, v, substantially as and for the purposes set forth.

65,151.—CAR COUPLING.—John D. Anderson, Corry, Pa.

I claim the construction and arrangement of the link, B, fitting over the hooks, C, upon the upper side of the draw heads, said link catching over the pins, g, and prevented from slipping when in a vertical position by means of the circular projections, h, and coupled by means of the bent arm, d, striking the projection, a, upon the draw heads, as herein shown and described.

65,152.—CLOTHES-DRYER ATTACHMENT FOR STOVE PIPES.—Abram P. Anthony, Morrison, Ill.

I claim the wire, B, forming the ring, B2, and loops, B1, in combination with the ring, C, by means of which it may be clamped upon a stove pipe substantially as and for the purpose set forth.

65,153.—LATH FOR PLASTERING.—Ellicott D. Averell, New York City.

I claim a lath constructed with countersunk apertures, A', substantially as herein set forth for the purpose specified.

65,154.—ROTARY STEAM ENGINE.—Thomas Banta, Hoboken, N. J.

I claim, 1st, The combination of the rings, R S T U, with the stuffing boxes, L M N O, shafts, G H I J, radial arms, D E F, and flange, V, substantially as herein shown and described and for the purposes set forth.

2d, The combination of the flanged ring, W, and rods, X, with the shaft, J, flange, V, and flanged end of the packing box, O, substantially as herein shown and described and for the purpose set forth.

65,155.—CLASP FOR SECURING SHIRT COLLARS.—John Barbier, Boston, Mass.

I claim the within-described collar clasp, consisted of the two plates, a a', when pivoted together at or near the center, in combination with a spring, e, one of the plates being provided with a projection, f, which passes into or through an opening in the extremity of the opposite one, and the clasp being attached to the shirt by means of a stud, g, all arranged and operating substantially as described.

I also claim, in combination with the above, the socket, h, for receiving a pin projecting from the cravat or tie, substantially as set forth.

65,156.—APPARATUS FOR TEMPERING STEEL SPRINGS.—Ira N. Bevans (assignor to Eli Terry), Terryville, Conn.

I claim the feed rollers, C, in combination with the vessel, A, and receiving drum, D, substantially as and for the purpose set forth.

65,157.—BASKET FOR FEEDING TARRED CORNCOBS TO FURNACES.—Ezra Benim, Dayton, Ohio.

I claim the cob kindling basket, constructed substantially as herein described and for the purpose specified.

65,158.—CULTIVATOR.—Hiram Boys, Rushville, Ind.

I claim, 1st, The frame, A, as constructed with adjustable tail piece, a, arms, b, with swivels for connecting the shovel beams and rollers, E, with chains for attaching the shovel bars, when combined, arranged and operating in the manner and for the purposes herein specified.

2d, The beams, D D, shovel bars, f f', and shields, e e, connected by the adjustable bars, m m, in the manner and for the purposes set forth.

65,159.—MOLASSES VESSEL.—William Briggs (assignor to himself and Thomas Holmes), Bristol, R. I.

I claim, as a new article of manufacture, a pail or bucket, constructed and furnished as herein described, in combination with the gate, o, as herein set forth and for the purpose specified.

65,160.—FAUCET.—A. Brinckmann, New York City.

I claim the tube, A, spigot, B, spring, D, within the case, C, in combination with the washers, F G, having stops, c d, as herein described for the purpose specified.

65,161.—BOLT CUTTER.—Walter Britton, Abingdon, Ill.

I claim the guide, A, bars, B B', connected by a pivot bolt, b, at one end, and provided with cutters, c c, at the opposite end, and the levers, D D, provided with eccentrics, g g, all being combined and arranged substantially in the manner and for the purpose set forth.

65,162.—PIPE WRENCH.—James R. Brown, Boston, Mass., assignor to himself and W. S Lovell, Cambridgeport, Mass.

I claim, as my improvement the combination of the staple or clasp, the series of holes and the fulcrum pin and its spring, and their arrangement with the two crossed jaw levers, substantially in manner as specified.

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65,163.—CORSET CLASP.—Mellissa E. Bulkley, Providence, R. I.

I claim the use of the shield, s, or its equivalent, in combination with the clasp, constructed substantially as described for the purpose specified.

65,164.—HORSE RAKE.—Israel L. Bullock, Marcy, Ind.

I claim the levers, J J, having elastic pawls, L L, attached in combination with the shaft, M, provided with the foot boards, j j', and connected with the levers, J J, substantially as and for the purpose set forth.

65,165.—PENCIL SHARPENER.—Hubert Burgess, San Francisco, Cal.

I claim the case or box, A, tray, B, and file, C, for sharpening pencils, substantially as shown and described.

65,166.—CONVERTING MOTION.—H. Burk, Mineral Point, Ohio.

I claim the construction and arrangement of the pitman, D, the legs, a b, of which straddle the wheel, C, and are provided with rolls, c d, the former running in the groove, E, of the said wheel, and the other running on the metallic plate, f, of the bed, A, substantially as described and for the purpose specified.

65,167.—CAR SPRING.—F. Cajar, New York City.

I claim the improvement of a coiled or spiral spring and buffer for cars, etc., by providing the lower margins of the coil (viz., of their individual cones), with the ribs or projections. a and b, for the purpose and substantially as described above.

65,168.—VEHICLE.—John S. Campbell, Newton, N. J.

1st, I claim the carriage or sleigh body, A, when made of hard rubber and provided with flanges, b and c, and cross pieces, d, substantially as and for the purpose herein shown and described.

2d, The running gear of wagons and sleighs, when made of rubber, substantially as herein shown and described.

65,169.—PATTERN SIFTER.—Edward Card, North Providence, R. I.

I claim the combination of the steel arms, D D, and screw spindle wedge, E, constructed as described.

And again, I claim the combination of the device above set forth, with the plate, A, having a hole through its center countersunk on one side, as herein described and set forth.

65,170.—LINIMENT.—E. M. Carpenter, Elkhart, Ind.

I claim the liniment compounded of the ingredients, and for the purpose substantially as herein described.

65,171.—MELODEONS AND OTHER WIND INSTRUMENTS.—Riley W. Carpenter, Brattleboro, Vt. Antedated May 23, 1867.

1st, I claim the arrangement of the tremolo valve in or on the swell, substantially as specified.

2d, The connection of the tremolo valve with the key or keys of the instrument, in such manner as to bring it under perfect control of the finger by the independent action of the latter on the key, essentially as herein set forth.

65,172.—BATH TUB.—John Carroll, New York City.

1st, I claim the bath tub consisting of the body, c, with a half circular bottom, head rest, a, and foot rest, b, all composed of sheet metal, and surrounded by a layer, B, of thin wood, in such a manner as to conform to the shape of the inside of the tub, the wooden foot board, C, adjustable support, D, and metallic lining, g, substantially as herein shown and described.

2d, The thin covering, B, of wood, when laid around the body of a bath tub, with semicircular bottom, substantially as and for the purpose herein shown and described.

65,173.—MACHINE FOR CUTTING SHEET LEAD.—S. E. Chubbuck (assignor to Joseph H. Chadwick), Roxbury, Mass.

1st, I claim the arbor, G, provided with the rotary cutter, H, and adjusted in the hollow shank, B of the arms, C, by means of the spring, I, and set screws, J K, substantially as described for the purpose specified.

2d, In combination with the above I claim the transverse racks, E, guides, D D, in which the cross heads, b, slide, pinion, F, and transverse bar, L, substantially as described for the purpose specified.

65,174.—FLUID FOR DISINFECTING AND EMBALMING.—Henry C. Coffman, Washington Court House, Ohio.

I claim a disinfecting and embalming compound, prepared substantially as described and for the purpose set forth.

65,175.—TREATMENT OF SULPHATE OF ALUMINA.—Alexander Augus Croll, London, England.

1st, I claim the employment of carbonate of lime with the sulphate of alumina when the latter is in a heated state, substantially as herein described.

2d, The treatment of the roasted aluminous earth or clay with hot oil of vitriol, substantially as herein described.

65,176.—MODE OF CONSTRUCTING PAPER BAGS, ETC.—Luther C. Crowell, West Dennis, Mass.

1st, I claim the combination of the strips of tin or iron with wrapping paper or its equivalent when cemented, pasted, or otherwise securely connected together, and used as a self-sealing wrapper, as a new article of manufacture.

2d, The paper-bag, M, in combination with the opening, O, and thin strip of tin or folder, A, constructed and operating substantially in the manner and for the purpose herein shown and described.

65,177.—CUTTER, GRATER, AND SHARPENER.—Ephraim Culver, Shelburne Falls, Mass.

I claim the arrangement and combination of the revolving cylinder, c, having its projecting and transverse saw teeth of unequal length, and the cylinder, b, with the knives attached to it, and the grindstone, d, substantially as and for the purpose described.

65,178.—GAGES FOR HOLDING CLAPBOARDS.—William H. Cummings and Isaiah Babcock, Roonsboro' Iowa.

We claim the combination of the adjustable bars, a b' and d, the fixed dog, g, and the spring dog, h, and the lever, k, or their equivalent devices, arranged and operating substantially as and for the purposes herein described.

65,179.—COMPOSITION FOR COATING ROOFING, ETC.—Oscar A. Day and George W. Bishop, Saratoga Springs, N. Y.

We claim the combination substantially as herein described and for the purpose specified,

65,180.—HOISTING APPARATUS.—Joseph A. Dayton, (assignor to himself and Joseph Starr), New London, Conn.

I claim an improved hoisting apparatus formed by the combination of the chain wheel, B, shaft, D, gear wheels, E F, shaft, G, gear wheel, H, endless screw, I, shaft, J, and cranks, K, or their equivalent, with each other, and with the frame, A, of the machine, substantially as herein shown and described and for the purpose set forth.

65,181.—METAL CANS AND BOXES FOR PAINTS AND OTHER MATERIALS.—Frederick W. Devoe, New York City.

1st, I claim the can constructed with the internal swage, a, at the inner part thereof, substantially as and for the purpose specified.

2d, The combination of the rebate, b, of the cover, B, the internal swage, a, of the body of the can, and the gasket, c, substantially as and for the purpose specified.

3d, The recesses, d, in the cover, B, in combination with the upper edge of the body, A, and the internal swage, a, substantially as and for the purpose specified.

65,182.—ATTACHING THILLS TO VEHICLES.—George F. Dietz, Burlingham, N. Y.

I claim a carriage clip formed in two parts so as to be adjustable, when so constructed that one part can be moved on the other without loosening the clip on or detaching it from the axle.

65,183.—SHAFT COUPLING.—William H. Doane and John Richards, Cincinnati, Ohio. Antedated February 16, 1867.

1st, We claim the ring nut, c, for connecting the conical compressing shells, b b, in a shaft coupling, in the manner and for the purposes specified.

2d, We claim the sleeve, a, compressing shells, b b, and ring nut, c, of a shaft coupling, combined and operated in the manner and for the purpose set forth.

65,184.—BASE BURNING STOVE.—William C. Durant, West Troy, N. Y.

I claim a fuel reservoir of "base burning" stoves, having a series of horizontal apertures or openings, a a a, formed in and through its sides, said series of openings or apertures extending in succession from its base part upward to its top part, in manner substantially as herein described and for the purpose set forth.

Also, in combination with said series of apertures or openings, a a a, and respectively with each other, I claim a series of deflector plates or bands, G, said series extending in alternate succession with said apertures from the base part or bottom of the reservoir upward to its top, in manner substantially as herein fully set forth and for the purpose specified.

65,185.—MACHINE FOR CUTTING PLATE.—J. W. Durgin (assignor to E. Q. Norton and A. H. Norton), Bangor, Maine.

I claim the cutting of slate for roofing purposes, composed of a knife of a shape corresponding to that in which it is designed to cut the slate, and pivoted to the end of a bedpiece of a form corresponding to that of the knife, and of such dimensions that the knife may work over it with a lever or treadle applied to the knife, all arranged substantially in the manner as shown and described.

65,186.—COMPOSITION FOR SOAP.—C. J. Eames and C. A. Seely, New York City.

We claim a disinfectant soap compounded of the ingredients as above set forth.

65,187.—ARTIFICIAL LEGS.—Jonathan Emery, Cedar Falls, Iowa.

I claim, 1st, The construction of the frame, D D, in the form shown in figure 5, of the drawings, and so that it is applicable to the standard, b, on the steel sole plate, c, and will afford a baring forward of and in rear of the axis of motion of the leg, A, and also serve as the means for connecting the leg to the foot, all in the manner herein described and shown.

2d, The construction of the heel extension, a, and concave ankle portion b, upon the leg, A, in combination with the heel spring, d, frame, D, and foot section, B, substantially as described.

65,188.—TOBACCO POUCH.—John G. Ernst, Baltimore, Md.

I claim the elongated hinges, d d, of frame, B, in combination with spring, c, or its equivalent, the concaved metal plate, D, and nipple, E, the whole secured to bag or pouch, A, in the manner described and for the purpose specified.

65,189.—WHEAT DAMPENER.—Jacob Eslaman, Belleville, Ill.

I claim the combination of the conveyor-screw, B, and mixing trough, A, with the steam dampening apparatus, consisting of the spout, c, and steam-pipe, E, arranged in manner described

65,190.—TANNING.—O. B. Evans, Buffalo, N. Y.

I claim compounds or solutions for tanning hides and skins, composed of the ingredients specified, mixed together in or about the proportions described, substantially as and for the purposes set forth.

65,191.—MACHINE FOR DRILLING HARVESTER GUARD FINGERS.—Jerome Fassler, Springfield Ohio.

I claim the main frame, A, constructed as described, and mounted upon the hollow pillars, B B, and bed plate, C, as and for the purpose set forth.

The crank, S, connecting clutch rod, R, and lever, T, in combination, the two former being behind, and the latter in front of the frame, as and for the purpose shown and described.

Arranging the stop lever, T, and hand wheel, W, with the other operative mechanism in the manner and for the purpose shown and described.

The construction and arrangement of the plug, k, and follower, n, in the end of a hollow drill stock as described.

The steel pattern bar, p, with the clamps, q q, as and for the purpose set forth.

The trough, o, constructed as described and for the purpose set forth.

65,192.—MACHINES FOR MILLING HARVESTER GUARD FINGERS.—Jerome Fassler, Springfield, Ohio.

I claim the combination of the main shaft, G, which carries the cutters and the counter shaft, H, which receives motion from the driving power, both mounted upon the carriage, F, with the feed shaft, S, constructed and arranged substantially in the manner shown.

The arrangement substantially as shown of the main shaft, G, and counter shaft, H, both upon the vertically moving carriage, F, cutters, O O, gearing J K, and pulley, L, all outside of the bearings of said shafts.

Securing the guard fingers, e, to the holding bed, g, in the manner shown to hold them firmly while being faced off by the cutters.

The combination of the detachable holding bed, g, with the carriage, P, whereby duplicate holders may be used and one set being prepared while another is being operated upon in the manner shown and described.

The detachable holding bed, g, carriage, P, and feed screw, Q, combined with the hand wheel, R, worm, S, and driving band, T, all combined for joint operation substantially as shown,

The combination of the set stop, Y, let off device, W X Z, and dropping box, V, to stop the movement of the carriage, P, at the desired point.

The detachable holding block, g, in which two or more guard fingers may be secured at one time, in combination with the carriage, P, and cutters, O, of a milling machine.

65,193.—MACHINES FOR SLOTTING HARVESTER GUARD FINGERS.—Jerome Fassler, Springfield, Ohio.

I claim securing the guide rods, constructed as described to the table, A, substantially in the manner shown and set forth.

The rods, L L, to connect the heads, K K, of the saw frame in connection with the independent guide rods, H H, in the manner shown and for the purpose set forth.

The straining heads, M, constructed as described, with the set screws, O O Q, and the pin, P, passing through a horizontal slot for the purpose set forth.

The holding block, g, constructed as described to hold the guard finger, h, while being slotted as set forth.

In combination with the holding block, g, the point holder, f, all constructed as and for the purpose set forth.

The carriage, T, and holding blocks, f and g, combined and arranged as set forth.

The combination of the carriage, T, holding blocks, g and f, and the saw frame, K L, when the carriage and holding blocks are located and arranged between the parts of the saw frame as set forth.

The arrangement of the shaft, V, pawl, W, and crank bar, Y, with the ratchet wheel, U, and head, K, of the saw frame to produce an automatic feed for the carriage, T, as set forth.

In combination with the automatic feed motion herein described, the lever, b, spring, c, latch, d, and pin, e, for the purpose of disconnecting the said feed and arresting the forward motion of the carriage, T, as and for the purpose set forth.

65,194.—FIRE ESCAPE AND ALARM.—Julius Fischer, New York City.

1st, I claim the combination of an alarm bell or of alarm bells, with a life saving apparatus connected in such a manner that the life-saving apparatus, when being brought in readiness to be used, will set the bell or bells in motion, for the purpose as herein fully described.

2d, I claim in combination with the above a chain attached to the ladder, by means of which said ladder may be unwound from a windlass, for the purpose as herein described.

3d, I claim the combination of a sliding frame, with a windlass and chain ladder, the whole being constructed and operating as and for the purpose herein fully described and set forth.

65,195.—WHEAT DRILL.—D. S. Fisher, Cedar Spring, Ind.

I claim the rotating shaft, B, provided with the pins, a, in combination with the perforated board, C, and the reciprocating slide, D, operated by the cam, H, all arranged substantially in the manner as and for the purpose set forth.

65,196.—HARROW.—D. S. Fisher, Cedar Spring, Ind.

I claim the revolving harrows, F F, secured to the lower ends of vertical shafts, D D, which are fitted loosely in bars, A A, or any suitable framing, substantially as and for the purpose set forth,

2d, The circumferential grooves, c, in the upper parts of the harrow shafts, D D, in combination with the pins, d, all arranged substantially as and for the purpose specified.

65,197.—CORN PLANTER.—D. S. Fisher, Cedar Spring, Ind.

1st, I claim the rotating shaft, D, provided with pins, a, and the slide, E, in combination with the reciprocating slide, F, spring, H, and the wheel, I, provided with one or more projections, f, all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The hoe, N, attached to the shaft, L, in combination with the spring, O, and the wheel, I, provided with one or more projections, r, and the arm, g, on one end of shaft, L, all arranged to operate in the manner substantially as and for the purpose set forth.

65,198.—PLOW.—D. S. Fisher, Cedar Spring, Ind.

1st, I claim the rising and falling or adjustable plow bars, E F, one or more arranged with a lever or levers, C D, and having rotary coulters, J, attached all arranged substantially as and for the purpose set forth.

2d, The spring catches, J* one or more arranged with the bars, E F, and levers, C D, substantially as and for the purpose specified.

3d, Providing the coulter, J*, with radial ribs, a, substantially as and for the purpose set forth.

65,199.—PROPELLING WHEELED CARRIAGES.—D. S. Fisher, Cedar Spring, Ind.

1st, I claim the frame, A, with small frame, D, shaft, a, spring, E, cogs, d t, and axle, B', with cog-wheel, b, all constructed, arranged and operating in the manner substantially as and for the purposes specified.

2d, The segment, F, shaft, G, ratchet, I, lever, H, and bar, R, all constructed and arranged for guiding the vehicle in the manner as set forth.

65,200.—HYDRAULIC ELEVATOR.—Henry Flad and George P. Herthel, Jr., St. Louis, Mo.

1st, We claim the combination of the cylinder, R, piston, b, sheaves, b1 b2, and system of pulleys, as arranged in relation to the reservoir, C, or supply pipe, D, and its connecting pipe, d, substantially as shown and described.

2d, The arrangement with the foregoing of the secondary reservoir, C', substantially as and for the purposes shown and described.

65,201.—CARRIAGE SEAT.—Chester D. Flynt, Collinsville, Ill.

I claim the spring cushion, C, in combination with the frame, A, and the bands, B, substantially as described.

65,202.—PROPELLER.—F. G. Fowler, Springfield, Ill.

1st, I claim the eccentric, e, in combination with the blades, a", hung on pivots placed on their vertical central line, and revolving in the manner and for the purpose substantially as described.

2d, The chain wheels, r", and chain, r', or their equivalents, in combination with the eccentric, e, and blades, a", arranged in the manner and for the purposes substantially as shown.

65,203.—MEDICAL COMPOUND FOR TREATING RINGBONE, SPAVIN, ETC., IN HORSES.—Abel M. French, Burton, Ohio.

I claim the herein-described compound, formed of the ingredients named, and applied substantially as and for the purpose specified.

65,204.—BOUQUET HOLDER.—A. D. Frye, Jr., New York City.

I claim the tube, A, formed in one or more parts, in combination with the reversible scroll, B, either removably or securely attached for the purpose of holding bouquets or handkerchiefs, substantially as herein shown and described.

65,205.—APPARATUS FOR EVAPORATING AND CONCENTRATING CANE JUICE AND OTHER LIQUIDS.—Alfred Fryer, Manchester, England.

1st, I claim treating cane juice and saccharine solutions and liquids, in order to obtain what I term "Fryer's Concrete" or sugar, in a non-crystalline or semi-crystalline state, by exposing it or them to heat in shallow trays, and then to heat in a revolving cylinder, substantially in the manner herein set forth.

2d, Treating solutions and liquids for evaporating and concentrating purposes, by exposing them to heat in shallow trays and then to heat in a revolving cylinder, as herein set forth.

3d, Treating cane juice and saccharine and other solutions and liquids for evaporating and concentrating purposes by passing it or them through or into a revolving cylinder, heated from the inside and through the inside of which heated air is forced or driven.

4th, The machinery or apparatus for the concentration of cane juice and saccharine, and other solutions, and for the evaporation of liquids, consisting of shallow trays in combination with revolving cylinders, all constructed and acting substantially in the manner described.

62,206.—UMBRELLA.—Stephen F. Gates, Boston, Mass.

I claim, in combination with the tubular handle, sliding rod, and feather or spring stop, the groove or grooves in the tubular handle, operating as and for the purpose substantially as set forth.

65,207.—BURGLAR ALARM LOCK.—Auguste Leon Gennerat, Paris, France.

1st, I claim the construction and arrangement of the piece, A, secured to the piece, B, of the handle lock, working in the hollowing of the partition stop piece, D, to which the hammer, G, is secured, having trunnions, D D", piece, C, upon the trunnion, D", working from K to H thereon, spring, P, stop pin, M, and bell, as herein set forth for the purpose specified.

2d, In combination with the above, I claim the adjustable swivel, T, whereby the ringing of the bell is prevented, as herein set forth for the purpose specified.

65,208.—STEM-WINDING WATCH.—Fayette S. Giles, New York City.

I claim the toothed ring, C, in combination with the spur wheel, A, the spring barrel and the contrate wheel, c, attached to the winding stem or arbor, substantially as and for the purpose herein set forth.

65,209.—FENCE.—E. C. Gordon, Sevastopol, Ind.

I claim supporting and connecting the sections, A A, as constructed, by means of the anchor, B, in the manner herein specified and for the purposes set forth.

65,210.—GATE.—Gideon S. Granger and William Northrop, Wayland, N. Y.

We claim hinging the central post, G, at or just above the surface of the ground, substantially as herein shown and described and for the purpose set forth.

65,211.—SEPARATING CHEESE CURD FROM WHEY.—Sylvester Greene, Rome, N. Y.

I claim in the manufacture of cheese the separating of the whey from the curd, by means of a gradual pressure produced by a perforated plate and either with or without a strainer, substantially as herein shown and described.

65,212.—PLOW AND COTTON SCRAPER.—J. V. Greif, Ladu cah, Ky.

I claim the spur or projection, e, formed upon the share, C, and fitting into the slot or hole, f, of the mold board, in combination with the bolt, g, substantially as and for the purpose specified.

65,213.—BOAT-DETACHING TACKLE.—R. H. Griffith, Baltimore, Md.

I claim the rock shaft or rod, A, on which the cams, e e, are secured, when connected with the two pulley blocks, C C, one at each end of the boat, in combination with the pivoted hooks, f f, constructed and operating substantially as and for the purposes set forth.

65,214.—HOP TRELLIS.—Newell F. Guffin, Grovenors Corners, N. Y.

I claim the combination of the poles, A, planted in double parallel rows, and the transverse inclined poles, D, interlocking the former to which they are attached by hoops or loops, C, and eyes, B, substantially as and for the purpose set forth.

65,215.—APPARATUS FOR TEMPERING STEEL WIRE.—John Hallas, New York City.

1st, I claim in an apparatus for hardening and tempering wire, substantially of the character described, causing the wire, after it has passed through the heating pot in the furnace, or through the latter and oil or other bath, to be run or returned in its passage through the tempering pot for after collection or take up, to the same side of the furnace from which the green wire was fed, substantially as specified.

2d, The arrangement on or in connection with the same furnace in which is located the first or heating pot, B, of the tempering pot, F, having its temperature controlled by dampers, essentially as and for the purpose or purposes herein set forth.

65,216.—SAFETY BRIDLE.—S. B. Hartman, Millersville, Pa.

I claim the employment or use of friction rollers, b, applied to the cheek straps, C, of the bridle, in combination with the bit, D, head strap, E, and reins, d, all arranged substantially as and for the purpose set forth.

I further claim the elastic reins, e, in combination with the reins, d, cheek straps, C, and bit, D, all arranged and applied to the bridle, substantially as and for the purpose specified.

65,217.—SAWING MACHINE.—Henry Hassenpflug, Huntingdon, Pa., assignor to hsmself and Edward Hassenpflug.

I claim the feed device, consisting of the weighted cord, l, arranged in relation with the pawl, p, and ratchet bar, q, all made as described, and operating so that the carriage shall be moved towards the saw, as herein set forth for the purpose specified.

65,218.—HARVESTER.—B. G. H. Hathaway, Rock Stream, N. Y.

1st, I claim the spherical case when attached to the axle and constructed in two parts, C and C', and having a projecting cylindrical pipe, C", which form bearing at P' and P", for the attachment of the cutting apparatus, substantially as set forth.

2d, The combination of the lever, H, yoke, H1. clutch, H2. radial arms with depression, D1, and the planel wheels, E, when constructed and arranged substantially as set forth.

3d, The braces, N and N' and N", in combination with the tongue, O bracket, P, and pipe, C", when constructed and arranged substantially as set forth.

4th, So arranging the braces uniting the cutter bar with the supporting frame of the machine as that they may oscillate upon and around the pipe, C", substantially as set forth.

5th, The combination of the lever, Q', arm, Q, bracket, P, and pipe, C", substantially as set forth.

65,219.—HARVESTER.—B. G. H. Hathaway and George M. Hathaway, Rock Stream, N. Y.

1st, We claim the ground wheel, C, in combination with the planet wheels, D, pivoted to its inner face, and a fixed gearing, H', communicating motion to a pinion, E, so arranged in combination with a detent that it can revolve only with the forward motion of the ground wheel, substantially as described.

2d, The combination with the planet wheel, D, pinion, E, detent, E', and rachet wheel, F, when said parts are respectively constructed and arranged substantially as set forth.

3d, The hemispherical case, H, when constructed with internal gearing, H', and having a collar by which it is attached to a rigid axle, so as to dispense with a frame, substantially as set forth.

4th, The combination with the ratchet wheel, F, bevel wheel, G, and collar, I, with its pins, I', yoke, I", rod, I"', and lever, I"", substantially as and for the purpose set forth.

5th, The arrangement of the case, H, axle, B, tongue, A, brace, T, shoe, M, and frame, O, substantially as set forth.

6th, The combination of the wheel, R, arm, Q, frame, O, and lever, P, said parts being respectively constructed and arranged as and for the purpose set forth.

65,220.—CLUTCH.—Albert Heth and Gaylon Hall, Adams' N. Y.

We claim a clutch for suspending hay forks and other articles, said clutch consisting of a frame, A, provided with adjustable sliding brace, i, and revolving pointed pins, f and h, and with a swivel hook, e, all made and operating substantially as herein shown and described.

65,221.—GOVERNOR.—Charles Hindle, Brooklyn, N. Y. Antedated May 16, 1867.

I claim the tension spring, j, and regulating screw, l, in combination with the governor, B, and valve, c, in the pump barrel, A, arranged substantially as and for the purpose set forth.

65,222.—BEDSTEAD.—Jacob Hoert, New York City.

I claim the arrangement and combination of the toggle braces, H D, legs, E, and frame, B, with the flexible bottom, A, constructed and operating substantially as and for the purpose described.

65,223.—ROLLER FOR FLOOR CLOTH.—Robert Hoskin, Brooklyn, N. Y.

I claim a roller, which is constructed substantially as described, for receiving cloth upon it for drying, so that the surfaces of the cloth are kept separate.

65,224.—MACHINE FOR WASHING LEATHER.—Adolphus Howard, Wellsville, N. Y., and George F. Howard, Chicago, Ill.

1st, We claim two or more revolving brushes, or their equivalents, for washing or removing the sediment from leather, for the purposes and substantially as herein described.

2d, In combination with the brushes, E E, the tanks, B B, or equivalents, for the purposes and substantially as herein set forth.

65,225.—CARTRIDGE BOX.—Charles Howlett, New York City, assignor to himself and William Freeborn.

I claim a cartridge holder, formed of a series of strips or plates of suitable material, with raised edges or grooves to clasp the base of a cartridge, when arranged in combination with a cartridge box, substantially as and for the purpose set forth.

65,226.—MOLDING MACHINE.—George S. Hudson, Ellisburgh N. Y.

I claim the combination of the cutter shaft, D, the reciprocating frame, E and the walking beam, G, or the equivalents of them, or either of them, the said combination being so arranged, substantially as described, that by its mode of operation the cutter shaft, D, and the cutter head, z, shall rise and fall while in motion to cut any required depth or curve in wave or serpentine wood moldings.

65,227.—APPARATUS FOR CONCENTRATING SULPHURIC ACID AND OTHER LIQUIDS.—John Hughes, Brooklyn, N. Y.,

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assignor to himself and James R. Hitchcock, New York City.

1st, I claim the flat pans, E or H, arranged in a furnace, substantially as herein shown and described.

2d, The furnace, A, provided with a longitudinal chamber, B, and with the transverse plates, D or I, substantially for the purposes and in the manner herein shown and described.

3d, The manner herein shown and described of transferring the acid from one pan to another, either by spouts, e, and an inclined chamber, B, or by means of syphons, K K, substantially as herein shown and described.

4th, An apparatus for concentrating sulphuric acid, made and operating substantially as herein shown and described.

65,228.—CAR COUPLING.—R. H. Huston, Keokuk, Iowa.

1st, I claim a draw head with a chamber, B, for receiving a catch head, G, of the form described, said chamber having its side walls made flaring so as to cause the escape of the catch head should a car leave the track, substantially as described.

2d, A yielding guide plate, C, or its equivalent, in conjunction with a chamber, B, of the form, substantially as described.

3d, The combination of the draw head, which has a laterally flaring chamber, B, and the coupling bar, G, with semi-ellipsoidal catch heads on its ends, substantially as and for the purposes described.

65,229.—LANTERN.—John H. Irwin, Chicago, Ill.

1st, I claim extending the top of the inner globe, F, above the holes, d, in the lantern top, substantially in the manner and for the purposes specified.

2d, I claim supporting the said inner globe in such a manner that the oil cup can be removed from the lantern without disturbing said globe, substantially as specified.

3d, I claim so constructing a lantern that the interior globe can be removed from the lantern independently of the oil cup, substantially as described.

65,230.—LAMP.—John H. Irwin, Chicago, Ill.

1st, I claim, in combination with the lamp or its burner, the tube, D, or its equivalent, arranged and operating substantially as and for the purposes specified.

2nd, I claim in combination with said tube, B, a cooler, E, arranged so as to operate substantially as described.

65,231.—RUBBER BOOT FOR HORSES.—Joseph H. Jennings, Cambridgeport, Mass.

I claim for the curative treatment of the hoofs and lower parts of the legs of horses, a rubber boot, constructed and arranged substantially as specified.

65,232.—WINDOW-SASH FASTENER.—Ezram Johnson, Joliet, Ill.

I claim the toothed wheel, F, in the recess, b2, of the casing, B, attached to the end of the shaft, E, cam, D, and toothed bar, G, when constructed, arranged, and operating as herein set forth for the purpose specified.

65,233.—MINCING KNIFE.—Stephen C. Ketchum, Winchendon, Mass.

1st, I claim a double-bladed chopping knife, the blades being so pivoted to the shank as to give a drawing cut at each stroke, substantially as described.

2d, I claim so hinging two or more blades or knives together, and supporting them in such a position with springs, as to allow the cutting edges to conform to any suitable concave, or the curves of a chopping tray or bowl, as herein described.

3d, I claim the combination of the cutting blades, B B, fulcrum pins, d d, shank, A, springs, C C, with the bolt and thumb nut, D, operating in the manner herein described for the purpose set forth.

65,234.—CHURN.—S. P. Kingsley, Springfield, Wis.

First, I claim the arrangement of the dasher having cylinder, E, beveled arms, i i i i, and wires, S S, or their equivalents, when constructed and used in the manner and for the purposes specified.

Second, The combination of the dasher as constructed with the churn box, A, when operating in the manner as set forth.

65,235.—MEDICAL COMPOUND.—Margaret Knotts, Carondelet, Mo.

I claim the medical compound made substantially as and for the purpose described.

65,236.—HOLDER AND SEAT FOR WAGON BRAKES.—Henry C. Kochensperger, Thornville, Ohio.

First, I claim the holder, A, constructed substantially as described, in combination with the brake bar, or its equivalent, as set forth.

Second, The combination of the holder, A, and rubber, D, substantially as and for the purpose specified.

65,237.—HORSE HAY FORK.—E. M. Krum, Nassau, N. Y.

First, I claim the construction as the curved tines, A A, with angular portions, A' A', and with jointing portions, a a, said tines being connected together by means of a pivot, b, and toggle links, c c c d, the link, d, being constructed and operating in the manner shown all substantially in the manner and for the purpose set forth.

Second, The arrangement of the cords, B B B, and line, g', in combination with the pivoted tines, A A', toggle links, c c c, and lever link, d, all in the manner and for the purpose described.

Third, The arrangement of the stop, g, on one of the toggle levers in combination with the lever link, d, of the toggle, c c c d, substantially in the manner and for the purpose described.

65,238.—FAUCET.—John Laing, Hoboken, N. J., assignor to himself and George Nimmo.

I claim a faucet formed with a pipe extending from the seat, i', of the disk valve, n, across the water way, g, and receiving the spindle, i, of said valve, as and for the purposes set forth.

65,239.—BALE TIE.—Henry Lampson, London, England.

I claim securing the ends of the band, a, together by passing the end, a', through the metal loop b, and turning the same back upon the inside of the said band the opposite end, a2, passing through the loop, b', and through the loop, b, and turned back short over the outside of the loop, b, and inserted again in the loop, b', and the latter slipped up toward the loop, b, when all are arranged and operating substantially as herein shown and described.

65,240.—CHEMICAL FIRE ENGINE.—R. Lapham and G. Clark, Jr., Boston, Mass.

First, We claim the admixing of chemicals for producing carbonic acid gas, substantially as described and for the purpose set forth.

Second, The use of pumps when they are employed for forcing upon the fire chemical solutions which when brought together produce carbonic acid gas.

65,241.—TUBE WELL.—Cornelius H. Latham, Randolph, N. Y.

I claim the arrangement of the slotted tube, A, with point, B, shrunk upon it when used in combination with the coupling, E, as constructed with valve box seat and the pump sections, D D, in the manner substantially as and for the purposes herein fully set forth.

65,242.—MACHINE FOR STRAIGHTENING BARS.—George Lauder, Pittsburgh, Pa.

I claim the worm, E, and worm wheels, B and C, arranged relatively to the skewed straightening rolls, B C, and to the housing, A, or its equivalent, substantially as and for the purpose herein set forth,

65,243.—REVOLVING TABLET FOR MULTIPLYING PHOTOGRAPHIC PICTURES.—Jewett Lawrence, Ripon, Wis.

I claim the revolving tablet G, the cross bar, C, and the standard, E, arranged in the camera, as and for the purpose specified.

65,244.—MACHINE FOR STAMPING CLAY DOOR KNOBS.—George Lawton (assignor to George James), Trenton, N. J.

First, I claim the arrangement and construction of the cams, D, whereby the dies, e, are operated three times in succession the said cams consisting of the parts, h i and k, all made and operating substantially as and for the purpose herein shown and described.

Second, The device for raising the pushers, H, so as to lift the stamped articles out of the matrices, c, the said devices consisting of the cams, o, levers, n, and rods, m, all made and operating substantially as herein shown and described.

Third, The spring, s, when arranged as herein shown and described for the purpose of depressing the pushers, H, as set forth.

Fourth, The device for forming the small horizontal holes at the bottom of the shank holes in door knobs, said device consisting of the pins, p, tubes, H, springs, q, and pins, r, all made and operating substantially as herein shown and described.

65,245.—ROSE ENGINE LATHE.—Thomas Lippiatt, New York City.

First, I claim the swinging frame, K, suspended from the sliding stock, r, and furnished with the tracing pin, u, in combination with the pattern, E, and sliding tool box, I, substantially as herein set forth for the purpose specified.

Second, The sliding frame, C, main frame, A, and adjustable frame, D, combined and arranged in relation with each other and with the tool box, I, swinging frame, K, and pattern E, substantially as herein set forth for the purpose specified.

65,246.—FASTENINGS FOR CORSETS.—James P. Love, New York City.

First, I claim the manner herein shown and described of securing the steels, b b, in corsets by means of flaps, a and c, and hooks, d, and eyelets or button holes, e, all made and operating substantially as and for the purposes herein shown and described.

Second, The fastenings, f and g, in combination with the flaps, a and c, and steels, b, hooks, d, and eyelets or holes, e, all made and operating substantially as herein shown and described.

65,247.—SHOE SOLE.—Charles B. Loveland, Elizabethport, N. J.

First, I claim the movable metal plate, B, with the continuous bent lip, c, for clasping the sole, d, and having the half sole, b, attached thereto and fastened to the sole, a, by means of the screws and flanged nuts, m, as and for the purpose herein described.

Second, The adjustable metal lift, e, with front and rear set off with the tap, g, employed and fastened to the heel of a shoe by means of the screws, d s, fitting into the flanged nuts, n o, as and for the purpose herein specified,

65,248.—MACHINE FOR CUTTING STUBS.—Warren Lyon, New York City.

I claim the operating of the pivoted plate, E, through the medium of the segment rack, F, and pinion, C, when said plate, E, has a cutting plate, c, attached and is used in connection with a similar cutting plate, d, on a fixed standard or plate, A, to which the plate, E, is pivoted, all arranged substantially as and for the purpose specified.

The combination of devices composing the gage, arranged substantially as and for the purpose set forth.

65,249.—PORTABLE HAY PRESS.—Jacob Mauck, Cheshire, Ohio.

I claim a hay press having capstand, A, ropes, a and b, pulleys, c and d, clevis, I, pins, 2 and 3, carriage, C, stirrups, F, hooks, g g, and braces, f, constructed, combined and operating substantially as herein specified.

65,250.—BUTTON.—George W. McGill, Washington, D. C.

I claim the double or split metal shank for a button herein described in combination with a metal washer, constructed and applied substantially as described.

65,251.—SAWING MACHINE.—R. M. McGrath, Lafayette, Ind., assignor to himself and J. H. Gallagher.

I claim the arrangement of the lever, y', pulley, z, and its cord, x, and the lever, i', for placing within the control of the operator the management of the sawing and feeding devices of the machine,

65,252.—PADDLE WHEEL.—Alexander McKenzie (assignor to himself and William C. Davis), Newport, Ky.

I claim the arrangement of inclined blades or buckets, G, radial arms, B, oblique secondary arms, C, and brace rings, E, substantially as and for the purpose set forth.

65,253.—CALIPER.—G. L. McKnight, Worcester, Mass.

First, I claim the combination with the slotted standard or screw, B, of the screw, D, for holding the adjusting nut, C, substantially as described.

Second, The combination with the upper part of the body or part, A, of the spring, E, substantially as and for the purposes set forth.

65,254.—STEAM SAFETY VALVE.—E. Meggenhofen, Frankfort-on-the-Maine, Germany, administratrix of the estate of Edward Meggenhofer, deceased.

I claim the arrangement of the bell crank lever, C, connecting rod, D, with reference to the spring balance, A, constructed substantially as and for the purpose set forth.

65,255.—MODE OF BRACING AND STAYING BOATS.—F. Mertens, Cumberland, Md.

I claim the arrangement of the braces, E and F, and the cross ties, G, when constructed and combined with the tightening rods, H, as herein described and for the purpose set forth.

65,256.—COMPOUND FOR CURE OF HOG CHOLERA.—John H. Mesler, Symme's Corner, Ohio.

I claim a compound for the prevention and cure of hog cholera, made of the ingredients set forth.

65,257.—CARRIAGE WHEEL.—William F. Morton, New Haven, Conn.

I claim the double collar with its bars and flanges all cast in one piece, when the double collar is fitted to bind the hub and the flanges to support the spokes, substantially as herein described and set forth.

65,258.—ROOFING MATERIAL.—William Myler, Bridgeport, Ohio, assignor to George W. Johnson, Wheeling, W. Va.

The combination of coal tar, pine tar, soap stone, ochre, or other oxide, and hydraulic cement, substantially as specified.

65,259.—BOTTLE STOPPER.—Joseph Nathan, Washington, D. C.

First, I claim the screw, E, the lower part of its shank being made smooth, substantially as and for the purpose described.

Second, The blocks, b, on the wire, B, constructed and arranged substantially as described.

Third, The combination of the wire, B, blocks, c, yoke, C, screw, E, with the lower part of its shank, made smooth and stopper, i g, substantially as and for the purpose described.

65,260.—TRUNK LOCK.—Joseph Nock, Washington, D. C.

First, I claim the use of the crooked lever, E, or its equivalent, in combination with the tumblers, F, more or less in number, and the bolt, D, arranged substantially as described and shown.

Second, I claim the spindle, m, with the spring, n, when inserted and confined in the hasp, substantially as described and for the purposes set forth.

65,261.—TRUNK LOCK.—Joseph Nock, Washington, D. C.

I claim a series of spring tumblers, E, and levers, d, so arranged and combined that the key shall act directly upon a portion of said tumblers to release them from the staple and at the same time shall act on the levers, d, causing them to act upon and release either of the tumblers, in the manner substantially as described.

65,262.—PORTABLE CAMP BED.—Prince Nicholas Ouroussoff, St. Petersburg, Russia.

I claim making the bed in sections filled with cork dust, or its equivalent and furnished with a pocket, d, and flap sheet or covering, e, all substantially as and for the purpose described.

65,263.—STUMP EXTRACTOR.—Isaac Pardee, Vineland, N. J. and R. C. Parvin, Forest Grove, N. J., assignors to R. C. Parvin.

I claim the pawls, G G, resting upon the ledge, a, of the socket, E, with their lower inner corners rounded as shown at b, so that their upper ends will fall by their own gravity against the ratchet bars, F, and engaged therewith, when constructed and arranged as herein shown and described.

65,264.—LOCOMOTIVE PILOT.—B. F. Partridge, Jr., Columbus, Ky.

I claim the horizontal revolving disks, d d d, having their peripheries serrated, pivoted to the under side of the bottom plates, a a, in combination therewith and with the pilot frame, A, and inclined rollers, c, substantially as herein described for the purpose specified.

65,265.—HORSE SHOE MACHINE.—Charles H. Perkins and Richard W. Comstock, Providence, R. I.

I claim the combination in a machine for making horse shoes of the following instrumentalities, a rotary hammer, B, sliding anvil, E, or equivalent apparatus for supporting the shoe blank and the griping tongs, L, arranged relatively to each other and operating substantially as described for the purposes specified.

65,266.—PREPARATION OF PALM LEAF WARP AND WOOF FOR WEAVING.—Franklin Perrin, Cambridge, Mass.

I claim the employment of a lizature in the preparation of palm leaf strips, substantially as set forth.

65,267.—PLASTIC COMPOUND MADE FROM VEGETABLE FIBERS.—W. H Pierson, New Orleans, La.

First, I claim the formation of articles of manufacture, resembling stone, wood, whalebone, shell, horn and other rigid or elastic articles, out of plastic, or semi-soluble pyroxyline, prepared substantially in the manner and for the purposes herein set forth.

Second, I claim the combination of plastic as above described with vegetable or any other foreign matter, substantially in the manner for the purpose set forth.

Third, I also claim making woven cloths and other fabrics, water or air proof, by treating them with plastic, substantially as and for the purposes set forth.

Fourth, I claim the combination of plastic, with drying oils, for waterproofing, and transparencies and other purposes.

Fifth, I also claim combining plastic with metals, and various metallic substances in the pulverulent state, substantially as described.

Sixth, I also claim attaching by means of plastic, fur, plush or other short fiber, to any suitable surface, so as to give a fur-like surface, substantially as set forth.

Seventh, I also claim forming a compound for painting and coloring and other purposes by admixture of plastic and solvents, with paints, oils, dyestuffs and other coloring matter.

65,268.—MACHINE FOR RUBBING AND MIXING PAINTS, CHEMICALS, ETC.—Robert Poole, Baltimore, Md.

I claim a pan or other suitable holding vessel, revolving around its support and a series of rollers or mixers in said pan, revolving around their and a different support, and in the same direction with the pan, substantially as described.

I also claim in combination with a revolving pan and stirrers, a scraper which when let down in the pan will guide and direct the mixed or rubbed material to a central discharge opening in the bottom of the pan, substantially as described.

65,269.—METHOD OF RAISING AND LEVELING RAILROAD RAILS.—S. L. Porter (assignor to himself and W. F. Eaton, Rochelle, Ill.

I claim the bed plate, A, and the slide plate, B, combined with a graduated fulcrum for leveling railroad tracks, constructed and operating substantially as herein described.

65,270.—BOX FOR PUTTING UP TOOTH POWER.—Edmond Queru, New York City.

First, I claim the toilet box, constructed of the material and in the manner substantially as herein set forth.

Second, I claim securing the cutter thereon by the fibrous hinge, I J K, and seal, L M N, substantially as and for the purpose herein set forth.

65,271.—HORSE RAKE.—Joseph S. Randall, Grand Rapids, Mich.

First, I claim the independent sliding rake teeth furnished with springs and arranged upon a hinged bar, G, and operated substantially in the manner and for the purpose described.

Second, The combination of the independent sliding rake teeth furnished with springs with the hinged bar, G, substantially in the manner and for the purpose described.

Third, The combination of slotted bar, F, hinged bar, G, forked pieces, g, and curved rake teeth, J, with springs, h, arranged upon a frame, A, substantially as described.

Fourth, A vertically adjustable vibrating fork, in combination with a vibrating hay rake, substantially as described.

Fifth, The arrangement of the springs, h, substantially in the manner and for the purpose described.

65,272.—SLEEPING CAR.—J. Wyatt Reid, New York City.

First, I claim the bed, D, suspended by chains, a, horizontal shaft, d, provided with ratchet and pawls, hooks, i i, and s s, when constructed and arranged within the sleeping car, substantially as herein set forth and for the purpose specified.

65,273.—PORTABLE SHELF.—Benjamin F, Rice, Boston, Mass.

I claim the pivoted or jointed parts, i d, and g k, in combination with a portable shelf or receptacle, as a new article of manufacture.

65,274.—HANGER FOR SHAFTING.—John Richards, Cincinnati, Ohio.

I claim a hanger for shafting constructed with the pivoted box support, Y and its means of adjustment, operating substantially in the manner and for the purpose herein set forth.

65,275.—PROCESS OF CHILLING OIL AND FAT.—J. E. Richardson, New York City.

I claim the method of chilling oil substantially as herein set forth so that the ice is brought in direct contact with the lard in the manner specified.

65,276.—TUBE WELL.—John W. Ricker, Chelsea, Mass.

I claim in combination with the induction well tube, a coiled spring arranged to operate substantially as and for the purpose set forth.

Also in combination with a well tube, the concave surfaces and triangular pointed drill, substantially as set forth.

65,277.—MODE OF SECURING THE TINES OF FORKS AND RAKES TO THEIR HANDLES.—J. P. W. Riley, Montrose, Pa.

First, I claim making the tines of a hay fork in two parts, which are scarfed in a mortise in the handle or ferrule and secured in position by means of keys or wedges, substantially as herein shown and described.

Second, In combination with the double tines, C C, I claim the double tines, D D, which when inserted in the handle in the manner specified will convert the device into a manure fork, and can be removed whenever desired, substantially as herein shown and described.

65,278.—CORN PLANTER.—Benjamin F. Robertson, Cap. au Gris, Mo.

I claim the employment of the partition, D, for the purpose of dividing and scattering the seed, substantially as described and set forth.

65,279.—FRUIT PICKER.—Oliver P. Rogers (assignor to himself and D. S. Barlett, Roxbury, Mass.

I claim a device for picking fruit, constructed in the manner substantially as herein shown and described.

65,280.—STEAM GENERATOR.—Robert P. Rogers and James Black, Philadelphia, Pa.

We claim, First, The beveled enlargement, a, of the boiler in combination with the curved or bowed tubes, B, for the circulation of the water, said tubes being attached at their upper ends to said enlargement, a, and at their lower ends directly to the body of the boiler in the manner and for the purpose substantially as shown and described.

Second, The construction of the tubes, B, with a continuous curve from one connection to the other of boiler, substantially as herein set forth.

Third, The screw nuts in combination with the outside circulating tubes and the shell of the boiler one at each end, substantially as herein set forth.

65,281.—STEAM GENERATOR.—Robert E. Rogers and James Black, Philadelphia, Pa.

We claim, First, The combination of the boiler, A, having the beveled enlargement, a, with the exterior curved tubes, B, for the circulation of the water and the flue tubes, C, in the manner and for the purposes substantially as described.

65,282.—WASHING MACHINE.—Robert Rooke, Empire City, Oregon.

I claim the founders, A, in combination with a rotary tub, C, placed within a fixed tub, A, and all arranged to operate substantially in the manner as and for the purpose herein set forth.

65,283.—DEVICE FOR SUSPENDING HAY FORKS.—W. S. Salisbury, Adams Center, N. Y.

I claim the two arms, A, pivoted together at one end and provided with points, E, at the other, in combination with the ratchet and spring pawl, substantially as and for the purpose described.

65,284.—FENCE.—J. W. Sanders, Ripon, Wis.

I claim the portable sections, A, as constructed, when used in combination with the stays, g g, blocks, b, and studs, in the manner and for the purposes specified.

65,285.—LANTERN.—Hugh Sangster (assignor to Horace Parmalee and William H. Bonnell), Buffalo, N. Y.

I claim, First, The combination of the springs, I I, catches, J J, and rim, G, with the apertures, R, as and for the purposes herein substantially set forth and described.

Second, The springs, when constructed of the parts, P P, as shown in fig. 5, and put together as described.

65,286.—HEATING ATTACHMENT FOR OIL LAMPS.—Egbert O. Schartan, Philadelphia, Pa.

I claim the chamber, P, with the kettle, J, with the lower half of the jointed glass chimney, when arranged, used, and combined as herein described and for the purposes set forth.

65,287.—LIFE PRESERVER.—Jehyleman Shaw, Bridgeport, Ct.

I claim the life preserver, constructed as described, consisting of the water and food receptacles, D E, attached to the portion, A, the water receptacle, D, provided with the air tube, G, and drinking tube, F, the food receptacle provided with the opening, H, closed with the plug, I, and the elastic bag, J, substantially as described for the purpose specified.

65,288.—PILL MACHINE.—Joseph H. Shaw, Saco, Me.

I claim the combination of the two curvilinear grooved plates, a a', united and operated by the two radial arms, c d, the plate, a, moving upon the stationary plate, a', and having for its axis the bolt, f, all as and for the purposes specified.

65,289.—GRATE BAR.—Joseph Sherman, Burlington, N. J.

First, I claim the horizontal tubular grate bars, A, open at B, and constructed with small orifices, a a, for the escape of the air on the three sides nearest the fire, and also with an opening, C, at or near the rear end, substantially as and for the purpose set forth.

Second, Ventilated grate bars, constructed with a vertical tubular and perforated extension, D, of the horizontal tubular portion of the bars, A, substantially as described,

65,290.—RESERVOIR DAMPING BRUSH.—Walter Shriver, New York City.

I claim, as a new article of manufacture, a reservoir damping brush for wetting paper for copying letters, arranged and constructed substantially as and for the purpose described.

65,291.—CAP FOR SPINNING MACHINES.—Joseph Smith, Loth, Belgium.

I claim the adjustable ring, B, in combination with the cap, A, and spool or bobbin, C, constructed and operating substantially as and for the purpose specified.

65,292.—APPARATUS FOR TANNING.—A. Steers (assignor to the American Tanning Co.), New York City.

First, I claim expressing the exhausted tanning liquor from hides or skins, substantially as herein shown and described, without the use of rollers.

Second, The metallic frame or frames, D, with their wire and cloth for keeping the hides or skins distended while being tanned, substantially as herein shown and described.

Third, Placing the hides or skins between two cloths during the process of tanning, substantially as herein shown and described and for the purpose set forth.

Fourth, Having the hides or skins attached to the frames, D, suspended in the vat by the ropes, f', and springs, n, substantially as herein shown and described and for the purpose set forth.

Fifth, The combination of the rammers, B, with the vat, A, substantially as herein shown and described, so as to produce a reciprocating action upon the skins or hides.

Sixth, The use of press platens, immersed in fluid, buoyantly adjusted and operating without friction, substantially as herein shown and described.

Seventh, The combination of spring platens or plates, l, rammers, B, vat, A, and frames, D, or their substantial equivalents, with each other, substantially as herein shown and described, and for the purpose set forth.

65,293.—SHAFT COUPLING.—John Stephen, Womelsdorf, Pa.

I claim the bar, B, provided with grooves, and the rubber, c c, when used in combination with the barrel, D, and when constructed in the manner substantially as and for the purposes specified.

65,294.—PEGGING MACHINE.—Edgar M. Stevens, Boston, Mass., assignor to William N. Ely, Stratford, Ct.

First, I claim the combination of a vibrating moving awl, with a sliding or vertically moving head, substantially as described.

Second, Combination of the feeding awl with the sliding and swinging head, substantially as set forth.

65,295.—STEAM GENERATOR.—Francis A. Stevens, Chicago, Ill. Antedated May 22, 1867.

First, I claim the ash pan, C, having the short tubes, c, in the sides arranged as herein specified, relatively to the permanently fixed pipes, D, and nozzles, d, discharging steam from the boiler into the tubes, c, as specified, and allowing the ash pan to be connected and disconnected without disturbing the steam connection.

Second, I claim the steam jets, d, blowing into the ash pan of the locomotive, arranged with reference to the exhaust reservoir, H, and the ring of jets, J, for facilitating the exit of the gases, substantially as and for the purpose herein specified.

Third, I claim the exhaust reservoir, H, made to correspond in form with and mounted in the interior of the smoke stack, I, so as to discharge the the steam from the ring of jets, J, and urge upward the gases in the space between the two conical casings in the stack, in the manner and for the purpose substantially as herein specified.

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65,296.—APPARATUS FOR CARBURETING AIR.—Levi Stevens, Fitchburg, Mass., assignor to Norman C. Munson, Shirley, Mass.

I claim the combination of an air-exhausting apparatus with the vaporizer, separate or distinct, in such manner that air may be drawn through the vaporizer and with the hydrocarbon vapors thereof, be drawn out of such vaporizer and into such exhausting apparatus, the whole being substantially as described.

I also claim the arrangement and connection of the air pumping apparatus and the vaporizer separate or distinct, in such manner that the hydro-carbon fluid may pass freely from one into the other of them, so as to stand at one level in both, and so that the wheel of the pumping apparatus while in rotation may revolve in such liquid as specified.

I also claim the combination of the fluid elevator and its operative mechanism, or their equivalents, with the tank, E, the vaporizer, and the air pumping apparatus.

I also claim the combination of the wire gauze disseminator, k l, with the perforated distributor, i, and the series of inclined plates or evaporating surfaces arranged beneath the same as specified.

I also claim the combination of one or more plates, m n o, and clothes, p p p, arranged together in the vaporizer, in manner and so as to operate as set forth.

I also claim the combination of the tortuous passage, G, at the lower part of the vaporizer, with the series of perforated plates, m n o, covered with layers of cloth as explained.

I also claim the arrangement of the tank, E, with the vaporizer and the air pumping apparatus, such tank being made to communicate with the vaporizer by means of an overflow pipe, x, leading up into the vaporizer, as specified.

I also claim the peculiar valve apparatus at the top of the vaporizer, the same consisting of the tube, e, the box, f, the holes, g g, and the annular valve, h, arranged together as described.

I also claim the combination of the fluid elevator and its operative mechanism, or their equivalents, with the vaporizer, arranged substantially as described.

I also claim the fluid elevator, or its equivalent, so arranged as automatically to elevate the carbureting liquid to the top or upper part of the vaporizer, substantially as described.

65,297.—DRAFT EQUALIZER FOR HORSE-POWERS.—Archibald Stewart, Troy, Wis.

I claim the combination of the tumbling rod, A, outer cylinder, B, coiled spring, E, interior cylinder or roller, C, and rod, D, with each other, substantially as herein shown and described and for the purpose set forth

65,298.—APPARATUS FOR REMOVING WATER FROM THE HOLDS OF VESSELS.—H. L. Stibbs, Savannah, Ga.

First, I claim the combination of the horizontal pipe, C, bent outlet pipe, D, and cone-shaped bottomless cup, E, with each other, substantially as herein shown and described and for the purpose set forth.

Second, The combination of the shaft, G, and crank arms, F and H, with the pipe, D, and bottomless cup, E, substantially as herein shown and described and for the purpose set forth.

65,299.—CLOTHES SPRINKLER.—E. B. Taylor, South Sudbury, Mass.

I claim the reservor, A, with its pipe, B, having extension flexible tube, C, terminating in a perforated head or cap, provided with a lever, when all constructed and arranged together substantially as and for the purpose described.

65,300.—MACHINE FOR SIZING HATS, ETC.—James S. Taylor, Danbury Conn.

First, I claim the diagonal vibrating felter, G, constructed and operating substantially as and for the purposes set forth.

Second, The mode herein described of imparting motion to the roll of goods by means of the felter, G, cranks, N, pitmans, L, and swings, H.

Third, The combination and arrangement of screws, K, sliding nuts, I, and swings, H, substantially as described, for the purpose of regulating the pressure of the felter.

Fourth, The felter, G, in combination with two or more rollers, C, substantially as and for the purposes set forth.

65,301.—COMPOUND FOR COATING OILCLOTHS, ETC.—John L. Tenney and John W. Bailey, Skowhegan, Me.

We claim the use of ground slate and clay when compounded in or about the proportions set forth and used in the manner and for the purpose described.

65,302.—MEDICAL COMPOUND.—James P. and Lemuel Thurmon, Warrenton, Mo.

We claim the improved medical composition produced substantially with the ingredients mixed together in or about the proportions stated, in combination and in mixture with the medical compound herein referred to.

65,303.—WOOD SPLITTING MACHINE.—Leonard Tilton, Brooklyn, E. D., N. Y.

First, I claim the two reciprocating cutters, G G1, of V form, placed one above the other in reverse positions and the lower cutter, G1, in advance of the upper one, G, substantially as and for the purpose set forth.

Second, The hopper, H, in combination with the cutters, G G1, and the holder, K, substantially as and for the purpose specified.

Third, Operating the holder, K, from the slide, F, to which the cutters are attached by means of the rod, L, connected with the slide as shown, and the spring, N, as set forth.

Fourth, Constructing the hopper, H, of the vertical parts, f f', one of which, f, is adjustable for the purpose of adapting the hopper to suit the length of the sticks to be split, as shown and described.

65,304.—DEVICE FOR TRANSMITTING MOTION.—Leonard Tilton, Brooklyn, N. Y.

I claim the cam, D, and bar, Q, in combination with the pulleys, F I J, gearing, H C c* c E, belt, H, and belt shipper composed of the arms, N N', arranged and operated automatically from the bar, Q, substantially in the manner as and for the purpose herein set forth.

65,305.—CLOTHES DRYER.—S. H. Titus, Pennington, N. J.

I claim the combination and construction of a clothes horse having the cross standards, A B and C D, parallel arms, E F G H E I and I' H, roller, L L, and belts, M M, ratchet, N, spring catch, P, and thumb head, O, with the clothes bars, K K K, substantially as above described and for the purposes herein set forth.

65,306.—FINISHING IRON WORK OF PLOWS, STOVES, PIPES, LEVEES, DAMS, ETC.—S. P. Townsend, Union Co., N. J.

First, I claim the finishing of plows, iron work for levees, dams, etc., piling, and other iron and steel work known mentioned, substantially as described and for the purpose set forth.

Second, The restoration to good condition by the means described of iron and steel work which has been damaged by oxidation or corrosion.

Third, A new article of sheet piling made substantially as described and for the purpose set forth.

65,307.—HOISTING MACHINE.—J. W. Tucker, New York City.

First, I claim the arrangement of the pulleys, d e f, and bifurcated chains, F, in relation with each other and with the platform, C, and winding drums, E, substantially as herein set forth for the purpose specified.

Second, The locking dog, J, and sliding shaft, I, combined in relation with each other and with the gearing which operates to elevate the platform, C, substantially as and for the purpose set forth.

Third, The friction brake, K, and pulley, l, arranged with reference to each other and with the sliding shaft, I, and the gearing which operates to raise the platform, C, substantially as herein described, for the purpose specified.

65,308.—WOOD PLANING MACHINE.—Wm. Tucker, Paris, Ill.

I claim the arrangement of the double cutter head, E, and friction pullies, K L L', capable of being simultaneously shifted for right or left hand cutting, substantially as set forth.

65,309.—BRAIDING MACHINE.—William Tunstill, Paterson, N. J.

First, I claim the case, p, fitted upon the carrier, d, in a braiding machine and containing the bobbin or cop from which the thread passes off upon the line or nearly so of the axis of said bobbin or cop, substantially as and for the purposes set forth.

Second, I claim the ratchet pulley, q, over which the thread passes pawl, 2, and finger, 6, in combination with the weight, r, substantially as and for the purposes specified.

Third, I claim the grooved ratchet wheel, q, over which the thread passes, pawl, 2, and weight, r, in combination with the cop or bobbin, p' substantially asand for the purposes specified.

Fourth, I claim friction wheel applied in substantially the manner specified between the driving pulley, k, and the main shaft, l, of a braiding machine in combination with the stopping and starting mechanism so that the machine may commence to move gradually instead of suddenly as set forth.

65,310.—CAR COUPLING.—Edward A. Turner (assignor to himself and John Morrissey), New York City.

I claim the coupling link, C, furnished near one end with the laterally projecting ears or lugs, h, in combination with the draw head, A, and a suitable coupling pin, substantially as herein set forth for the purpose specified.

65,311.—WAGON BRAKE LOCK.—Thomas Urie, Springfield, Iowa.

I claim the eccentric, c, in combination with the rod, d, the slotted lever, a, and the segment plate, b, for locking a wagon brake by means of the connecting rod, g, constructed, arranged and operating substantially as and for the purposes described.

65,312.—ROTARY STEAM ENGINE.—John H. Van Sandt and J. J. Hurt, Princeton, Ind.

We claim the arrangement of the cams, G, springs, g, valves, F, with reference to the system of cranks, e, connections leading from the shaft, L, substantially for the purpose specified.

65,313.—COMPOSITION FOR FILTERING PETROLEUM SIRUP AND OTHER LIQUIDS.—William V. Wyck, Belleville, N. J.

I claim the application of the above mentioned compound of soluble animal matter chalk and wood charcoal for the purification of petroleum and other oils, sugars, syrups and molasses and spirituous liquors by filtering these substances through the above mentioned compound or by any mode equivalent to filtration.

65,314.—PHOTOGRAPHIC CAMERAS.—George W. Venner, Charlestown, Mass. Antedated May 15, 1867.

First, I claim the compound sliding frame, M and J, made substantially as described and for the purpose set forth.

Second, The method of operating the said sliding frames, M and J, by means of the bar, H, roller, I, caps, c c, or their mechanical equivalent and the lower part of the adjusting board, C.

Third, The folding screws, d d', substantially as described and for the purpose set forth.

65,215.—BUTTER WORKER.—S. H. Wade, Montgomery Center, Vt.

First, I claim the combination of the pressers, E, sliding beam, G, and operating levers, H and J, with each other and with the frame of the machine, substantially as herein shown and described and for the purpose set forth.

Second, The combination of the pivoted table, D, and sliding frame, B, with each other and with the frame of the machine, substantially as herein shown and described and for the purpose set forth.

65,316.—DEVICE FOR UNLOADING AND STACKING HAY.—William R. Waldron, Webster, Mich.

I claim the combination of the poles, pullies, rope and anchorage when arranged substantially as herein described and for the purposes herein set forth.

65,317.—CARRIAGE SHACKLE.—F. M. Weller, Evanston, Ill. Antedated May 16, 1867.

I claim the carriage shackle constructed and operating substantially as described and specified.

65,318.—CAR SEAT.—Jesse S. Wheat, South Wheeling, W. Va.

First, I claim the cross head arms D, and slotted links c, in combination with the back of the seat C, and the ends A, arranged and operating substantially as and for the purposes herein described.

Second, The double inclined racks E, in combination with the guide plates c, arranged and operating as and for the purposes specified.

65,319.—MACHINE FOR CLEANING FLAX.—W. W. Whiddit.—Richmond, Ind.

First, I claim constructing a machine for cleaning flax, etc., with a door L, or its equivalent by which said machine is closed and the material confined until cleaned substantially as set forth.

Second, The octogonal shaped cylinder I, having flanged ends substantially as described and for the purpose specified.

Third, The reversible hopper B, operating on journals substantially as specified.

Forth, The arrangement and joint operation of hopper B, and door L, substantially as set forth.

Fifth, Loose pully c, provided with pin n, and lug o, or their equivalents, wheel D, either with or without teeth, provided with cam S, the latter either permanently attached or adjustable, in combination with slide P, detent T, and device W, all arranged substantially as set forth and for the purposes specified

65,320.—APPARATUS FOR COOLING LIQUIDS ON DRAUGHT.—Edward Whyte, Philadelphia, Pa.

I claim a cooler covered with felt ice-chamber, as described, opening a block B, and cylinders C, constructed and operating substantially as specified.

65,321.—COMPOSITION TO BE USED AS PUTTY FOR STONE WORK.—John R. William, Taunton, Mass.

I claim the improved composition of matter herein described for the purpose specified.

65,322.—LAMP BURNER.—John B. Wortham, Huntsville, Ala.

1st, I claim the ventilating collar or cylinder, c, constructed and operated and for the purposes substantially as herein set forth.

2d, In combination with the cylinder, c, the toothed edge of the plate, b, or its equivalent.

3d, The plates, i and j, for holding the cap open, as described.

65,323.—TANNING.—Francis H. Wright (assignor to himself, William C. Slade, and B. M. Pratt), Richmond, Ind.

I claim the use of the proportion of ingredients named in formulæ A and B, and the manner of applying the same to hides, furs, and skins, for the purpose of tanning the same rapidly and effectually.

64,324.—CORN HARVESTER.—John Wright and J. J. Johnson, Cold Water, Mich.

1st, We claim the arrangement of the knives, B B, with double or oblique motion, operated with slotted guides, or their equivalent, in combination with the stationary knives, A A, substantially in the manner and for the purposes herein set forth.

2d, The tilting platform, K, in combination with the stationary platforms, F F, the spring curved arms, M M, and spring catch, L, or its equivalent, substantially in the manner and for the purpose as herein described.

3d, The cutting knives, as arranged and operated in combination with the tilting platform, substantially in the manner and for the purpose as herein described.

65,325.—MACHINE FOR CUTTING OFF CIGARS.—P. Zern and W. Warwick, Pittsburg, Pa.

We claim the combination of the upright, B, with opening C, and plate, E, having similar openings, when the two are arranged and combined together substantially as and for the purpose described.

REISSUES.

2,622.—MACHINE FOR MAKING SEINE NETS.—William C. Hooper & Sons, Baltimore, Md., assignees of Benjamin Arnold. Patented Sept. 23, 1862. Antedated Aug. 3, 1860.

First, We claim the arrangement and combination substantially as described of the various implements employed in forming a loop, viz.: the bar, m', with the row of guides, c c c, and the bars, l and o, with their pins.

Second, We claim the bar, Y, with its double row of pins, for the purpose of holding the netting, as set forth and when constructed substantially as described.

Third, We claim the combination of the regulating screw or screws, i" i", with the levers, d" d" and V', for the purposes set forth when arranged substantially as described.

4th, We claim the carriage, j, with the rows of bars, a a, in combination with the raceways, S S', and thread carriers, a' a', when arranged substantially as described for the purpose set forth.

5th, We claim the toggle levers, H' H', for the purpose of drawing up the knot, substantially as herein described.

6th, We claim a machine constructed and operating substantially as described herein for making nets or netting.

2,623.—OPAQUE PIGMENT.—D. L. Bartlett and G. H. Hunt, Baltimore, Md., assignees of Stuart Gwynn. Patented Dec. 19, 1865. Antedated Dec. 5, 1865. (DIV. A.)

We claim opaque pigments made from any article whose normal atoms or molecules or particles have been crushed by pressure after having been purified, substantially as herein set forth.

2,624.—MANUFACTURE OF OPAQUE PIGMENTS.—D. L. Bartlett and G. H. Hunt, Baltimore, Md., assignees of Stuart Gwynn. Patented Dec. 19, 1865. Antedated Dec. 5, 1865. (Div. B.)

We claim the process of manufacturing opaque pigments by crushing and pulverizing the normal atoms or molecules, substantially as herein described.

2,625.—HARVESTER.—J. W. Bope, St. Louis, Mo. Patented Jan. 17, 1865.

First, I claim a tilting platform turning upon a pivot in rear of its forward edge and connected to the main frame of the machine through the medium of the finger bar only.

Second, A tilting platform having a fixed pivotal bearing at its outer or grain end and in rear of its forward edge in an arm or support which is attached to the finger bar and has no rear support from or connection with the main frame.

Third, A tilting platform vibrating upon a fixed pivot in rear of its forward edge in combination with the cutting apparatus and main frame in such manner as to leave an unobstructed space in rear of said platform for the delivery of the grain upon the ground.

Fourth, A cut-off for separating the falling grain from the completed gavel on the platform interposed by the tilting of the main platform upon a fixed point or pivot in rear of its forward edge.

Fifth, A platform which discharges the gavels by turning upon a pivot in rear of its forward edge in combination with the laterally projecting cutting apparatus of a two-wheel side draft machine.

Sixth, The combination in a two-wheel side draft machine of an adjustable cutting apparatus, a tilting platform connected thereto and turning upon a pivot in rear of its forward edge, and a lifting mechanism in such manner as that said cutting apparatus and platform can be raised for passing obstructions while the machine is in motion.

Seventh, Operating the tilting platform by means of the lever and the chain or cord, in the manner as and for the purpose herein described.

Eighth, The employment of a shield or guard for closing the opening between the finger bar and forward edge of the platform formed by the tilting of the platform on a pivot in rear of its forward edge.

2,626.—PICKER-STAFF MOTION FOR LOOMS.—Edmund H. Graham, Manchester, Mass., and Wanton Rouse, Taunton, Mass., assignees of Edmund H. Graham. Patented Oct. 16, 1860. Reissued Oct. 2, 1866.

We claim, First, The combination of a rocker of a picker staff with its bed by loose journals projecting each side of the picker staff and arranged beneath the picker staff, substantially as described.

Second, In combination with the rocker, the bed, and the journals the open boxes, substantially as and for the purpose described.

Third, In combination with the rocker and its bed the journal bearing arm, operating substantially as and for the purpose specified.

2,627.—PICKER-STAFF MOTION FOR LOOMS.—The Amoskeag Manufacturing Company, Manchester, N. H., assignees of Nehemiah S. Bean. Patented Jan. 22, 1866.

We claim the improved arrangement of the rocker, b, the link, c, and the support piece, e.

Also the arrangement of the spring, f, with the support piece, e, the link, c, and the rocker, b.

Also the arrangement of the ears, g, with the link, c, the support piece, e, and the rocker, b, the whole being substantially as specified.

2,628.—GENERATING GAS AND OBTAINING OTHER USEFUL PRODUCTS FROM ANIMAL AND VEGETABLE MATERIALS.—Thomas D. Ledyard, Toronto, Canada, assignee by mesne assignments of J. J. Ensley. Patented Aug. 28, 1866.

I claim making a compound gas by the mixture in proper proportions of gas made from wood or other vegetable matter with gas made from bones or other animal matter, substantially as and for the purpose herein specified.

I also claim the combination of the perforated charge cylinder or vessel, d, open at the inner end and the horizontal close retort cylinder or chamber, c, substantially as and for the purpose herein specified.

I also claim the vapor condensing vessels or chambers, k k, connected by the pipes, l l, and provided with discharge cocks, m m, when used in combination with the inclosing water tank, B, substantially as described.

I also claim the combination and arrangement of the tight vessel or chamber, q, and pipes, r r, with the pipe, n, for the purpose of pumping off the condensed water which gathers therein without admitting air or allowing escape of gas, substantially as set forth.

2,629.—DESULPHURIZING COAL AND ORES.—Jacob J. Storer, Boston, Mass. Patented April 9, 1861.

First, I claim the process substantially as described of forcing into the interstices of coal containing sulphurous impurities by the pressure of steam and either dissolved in it or mechanically conveyed by it chemicals proper to neutralize the sulphurous impurities.

Second, The employment of salts of ammonia forced by pressure of steam into the interstices of coals, as and for the purpose described.

2,630.—ATTACHING LABELS TO BOTTLES.—Elma E. Walton Newark, N. J., assignee by mesne assignments of Wm. N. Walton. Patented Sept. 23, 1862. (Div. A.)

First, I claim shaping the bottle whether in intaglio or in relievo so as to form a seat for and protect the label or inscription plate, substantially as and for the purposes set forth.

Second, The arrangement of the lip or ridge, a, whether distinct from or forming a part of the recess or seat for the label plate for preventing fluids, etc., entering or passing between the inscription plate and bottle, for the purposes set forth.

2,631.—BOTTLE FOR DRUGGISTS AND CHEMISTS.—Elma E. Walton, Newark, N. J., assignee by mesne assignments of Wm. N. Walton. Patented Sept. 23, 1862. (Div. B.)

I claim a bottle formed with a recess or seat for a label whether in intaglio or in relievo and having secured therein by cement or other suitable substance a label with a glass or transparent label or inscription plate, as a new and improved article of manufacture.

2,632.—HARVESTER.—Cyrenus Wheeler, Jr., Auburn, N. Y. Patented Feb. 6, 1855. Reissued June 5, 1860.

First, I claim the combination of a vibrating frame, a finger bar attached to one corner or end thereof by a hinge, and a platform in the rear of said finger bar so as to leave an unobstructed space for the delivering of the grain on to the ground.

Second, The combination of a vibrating frame with the cutting apparatus hinged thereto, a driver's seat and an arrangement of one or more levers whereby the driver in his seat can raise and sustain the cutting apparatus when desired.

Third, The combination of a finger bar hinged to a vibrating frame and a removable platform connected with the said frame by means of the finger bar only.

Fourth, The combination of a hinged finger beam and a side delivery platform so arranged that the grain may be delivered from the platform on to the ground out of the way of the horses or their next round.

Fifth, The combination of a hinged finger beam, a lever and a yielding or linked connection extending from the lever to the vibrating part of the machine to which the finger beam is attached, whereby the inner end of the finger beam is raised to pass obstacles in mowing and raised and sustained in reaping.

Sixth, The combination of a hinged finger beam, a lever, a yielding or linked connection extending from the lever to the vibrating part of the machine to which the finger beam is attached and the seat for the driver, whereby the driver can raise the inner end of the finger beam to pass obstacles in mowing and raised and sustained the same in reaping.

Seventh, The combination of a hinged finger beam with an auxiliary draft rod or bar attached to the inner end of the hinged finger bar.

Eighth, The platform bar, Q, as a means of securing the platform to the finger beam and for strengthening said finger beam when it has the platform to carry, substantially as described.

Ninth, The inclined caster wheel, S, arranged as represented and in combination with the platform, whereby the latter is elevated when the machine is being turned short around to the right, substantially as described.

Tenth, In combination with a finger beam and platform placed in rear of the main supporting wheel, the two casters, N S, arranged as described for allowing the machine to turn short around to the right, for the purposes specified.

Eleventh, A revolving track clearer when operated from a ground wheel through gearing, substantially as described.

DESIGNS.

2,659.—BOTTLE AND CAP.—Robert B. Parkinson, Philadelphia, Pa.

2,660.—HEEL PLATE FOR BOOTS, ETC.—Franklin Shaw, Braintree, Mass.

SIXTY-ONE patents reported in the above list were solicited through the Scientific American Patent Agency.—EDS.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

659.—COATING PAPER AND OTHER MATERIALS WITH FLUID SUBSTANCES SOLUTIONS AND COMPOUNDS FOR PHOTOGRAPHIC AND OTHER PURPOSES.—John C. Crossman, Boston, Mass. March 8, 1867.

956.—HANGING SHIPS' RUDDERS.—Henry H. Pember and Uriah E. Rogers, New York City. March 30, 1867.

1,150.—BREWERS' MASH TUNS.—James Walker, Cincinnati, Ohio. April 20, 1867.

1,162.—COTTON BALE TIE.—Henry Fassmann, New Orleans, La. April 20, 1867

1,178.—MODE OF AND APPARATUS FOR REMOVING THE CONTENTS FROM CENTRIFUGAL SUGAR MACHINES.—Helem Merrill, New York City. April 23, 1867.

1,186.—SEWING MACHINE.—Lewis B. Bruen, New York City. April 24, 1867.

1,196.—CONSTRUCTION OF KNIVES, FORKS, AND OTHER IMPLEMENTS OF CUTLERY.—George Parr, Buffalo, N. Y. April 25, 1867.

1,202.—SELF-ACTING TACKLE HOOK.—Charles Luxton, Hudson, N. J. April 25, 1867.

1,256.—MANUFACTURE OF BOOTS AND SHOES, ETC.—Thomas B. Smith, Boston, Mass. May 1, 1867.

1,313.—BINDERS FOR PAPERS, ETC., WHICH ALLOW THE WHOLE OR PARTS OF THE CONTENTS TO BE REMOVED OR EXCHANGED.—Noah M. Shafer, New York City. May 4, 1867.

1,340.—MACHINERY FOR MAKING ROVING AND FOR SPINNING INTO YARN.—Albert H. Gilman, Boston, Mass. May 7, 1867.

1,348.—HYDRAULIC VALVE GEAR FOR STEAM AND ANALOGOUS ENGINES.—Norman W. Wheeler, Brooklyn, N. Y. May 7, 1867.

1,349.—SKYLIGHTS AND VENTILATORS, AND SHAFT COUPLINGS FOR STEAM VESSELS.—Norman W. Wheeler, Brooklyn, N. Y. May 7, 1867.

1,350.—CONSTRUCTION AND PACKING OF SLIDE VALVE AND ADJACENT PARTS FOR STEAM AND OTHER ENGINES.—Norman W. Wheeler, Brooklyn, N. Y. May 7, 1867.

1,351.—APPARATUS FOR INTRODUCING AND CONTROLLING THE INTRODUCTION OF FLUIDS TO SURFACE CONDENSERS OF STEAM ENGINES.—Norman W. Wheeler, Brooklyn, N. Y. May 7, 1867.

EXTENSION NOTICE.

Daniel Noyes, of Abington, Mass, having petitioned for the extension of a patent granted to him the 25th day of October, 1853, for an improvement in machine hammers, for seven years from the expiration of said patent, which takes place on the 25th day of October, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 7th day of October next.

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Nach dem neuen Patent-Gesetze der Vereinigten Staaten, können Deutsche, sowie Bürger aller Länder mit einer einzigen Ausnahme, Patente zu denselben Bedingungen erlangen, wie Bürger der Ver. Staaten. —

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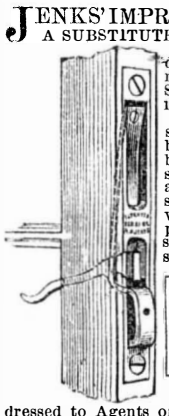

The engraving represents a Window Spring—a valuable Improvement by H. F. Jenks on the Foster Spring, well known for many years in the New England States.

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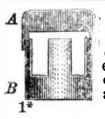

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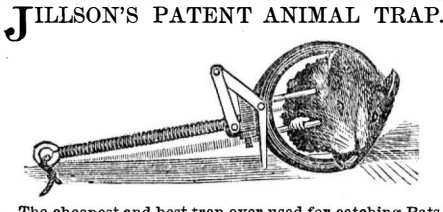

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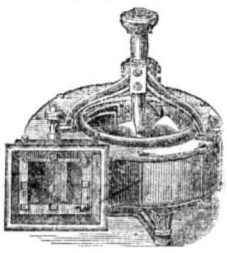

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